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Making Radiators Under New Conditions

Use of Tumbling Barrels an Innovation—Pouring Molds
Set Three-High—Layout and Material Handling
Equipment Are Features

BY GILBERT L. LACHER

PLANS for the future are now given serious consideration in the construction of an industrial plant, for the time has passed when a manufacturer will submit to the difficulties incurred in attempting to add to a factory built without regard to possible future extensions. One reason for the world-wide fame of the Gary, Ind., works of the Indiana Steel Co., now the largest individual steel plant on the globe, lies in the fact that complete plans for its ultimate development, carefully establishing the inter-relationship of all the various units, were completed before construction was started.

A recent example of a plant unit built on plans providing for future expansion is the new Chicago foundry of the Niagara Radiator & Boiler Co., North Tonawanda, N. Y. In fact, operations were started in this unit even before it was completed, to enable the company to take advantage of the heavy radiator buying which has accompanied unusual building activity in Chicago. The only radiator plant in that large metropolis, it has been hard pressed to supply the demand for its product ever since operations were begun in September. As fast as radiators have been assembled and inspected, automobile trucks have pulled up to the shipping platform to be loaded. Shipments by rail thus far have been almost unknown.

Additions in Prospect Will Change Layout

Only about one-half of the present plant is used for molding operations, but ultimately nearly the entire space will be used for that purpose, and machining and assembling operations will be performed elsewhere. Additions in immediate prospect include a new cleaning, grinding and assembly unit, 120 x 240 ft., and a 130-ft. extension to the present main building (now 135 x 400 ft.), which will house a new core room. With the completion of this program fully three-quarters of the present space will be used for molding, while the molding bays will be extended 30 ft. into the core

department addition. Present facilities for core making are temporary and are in use to permit production pending provision of more complete equipment.

Making cores for radiators is extremely exacting. The core boxes, of cast iron, have chaplet bearings which must be ground accurately to insure a satisfactory radiator casting. The wall of a radiator is only 5/32 in. thick, a fact which makes it imperative that cores come to size. The core benches are of the standard tube type, arranged next to the wall so that the core makers receive excellent light through the continuous sash. In the new addition, core benches will be arranged next to the windows at the end of the building, and a battery of ten oil-fired core ovens will be installed.

Method of Using Core Box Also as Dryer

In making a core, two core boxes placed side by side are rammed with sand and struck off, following which one box is rolled over onto the other. The top box is then removed, and the lower box containing the complete core is transferred to a rack. Thus the core box serves also as a core dryer. The steel racks, placed between the core benches, where they can be filled with a minimum of exertion by the core makers, are constructed to take care of any size of core from 14 to 45 in. in length. They have a capacity of 84 long cores and double that number in some of the smaller sizes. The racks are removed to the baking ovens by electric jack-lift trucks. At present there is a battery of three ovens, each oven holding four racks. The baking time is 3 hr.

A feature of the cores lies in the fact that they contain no wire or bar reinforcing; neither is any filling or fitting required after they are baked. The only operation required is to run a rod around the edges to scrape off any slight fins which may be found. From the racks the baked cores are loaded into boxes, and taken by jack-lift trucks to the various longitudinal

bays of the plant. Here the boxes are hooked onto an overhead electric traveling crane, which distributes the cores to the various molding floors.

Simplicity characterizes the molding operations—a very desirable feature in a production plant. Both the cope and the drag are rammed from a single metal pattern. The joint surface of this pattern is machined down 0.012 in. to permit the edges of the cope and drag to pinch, thereby preventing fins. Thus a sand joint has been obtained, rather than the metal joint of the cope and drag sections of the flask. The core is held in place in the mold almost entirely by chaplets. In the case of a steam radiator casting, the only contact to the core and the mold is at one nipple opening; in a hot water radiator mold there are two points of

stack rests on a single bottom board—a perforated steel plate stiffened by two heavy channels at the ends and angles on the sides, and furnished by the Trucson Steel Co. One bottom board supports from six to twelve molds, depending on their size. Before pouring, a top plate is placed on the stack and clamps are put on, holding the flasks tightly together. On the pouring side, the stack rests on a timber which tilts it sufficiently to insure the flow of the molten iron from the gates to the end of the molds. The stacks are arranged in double rows, the gates being turned toward the intervening aisle, which is directly under an overhead monorail. The monorail system is the Whiting Corporation short-turn type, which permits the molding floors to be utilized right up to each turn

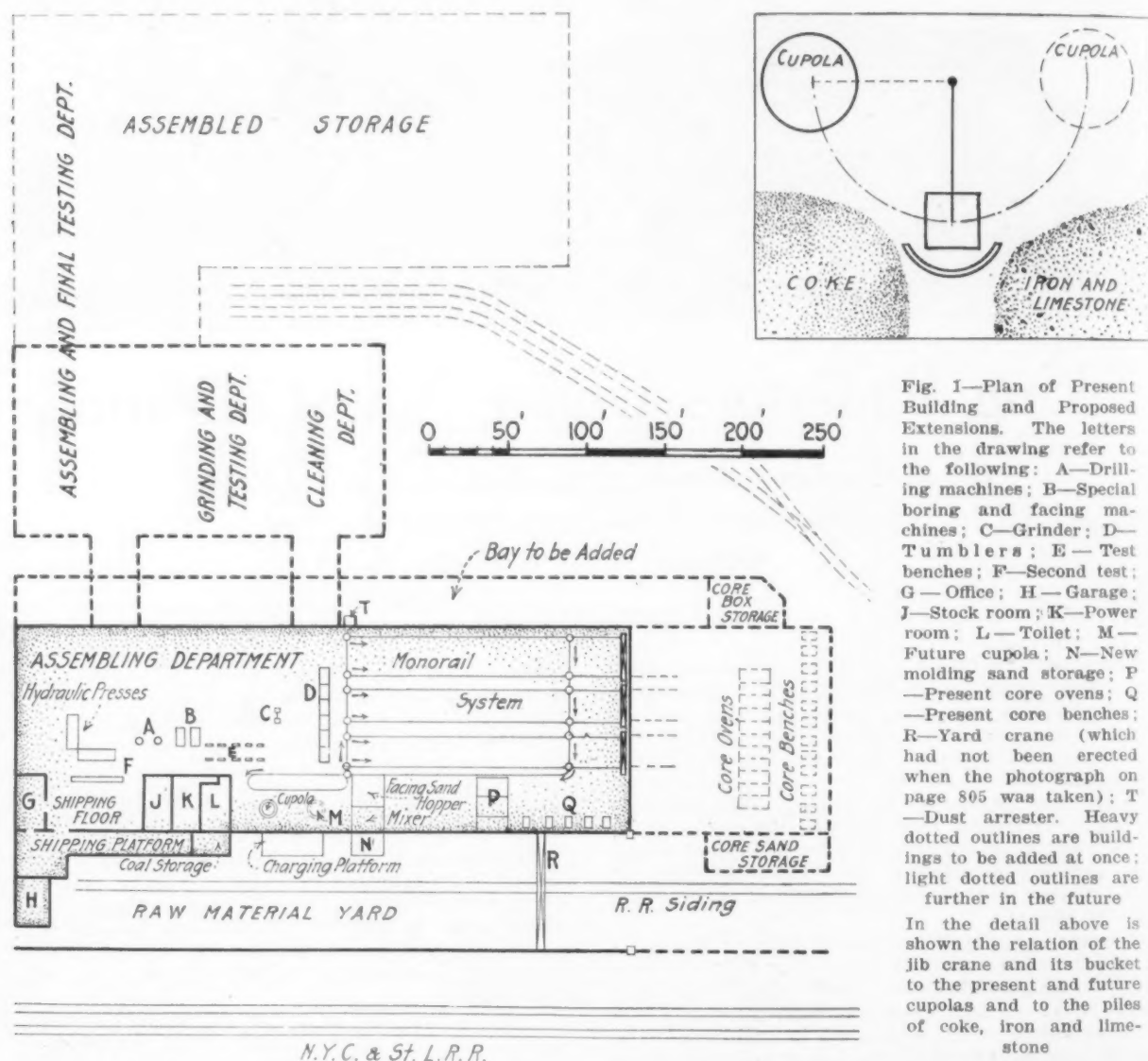


Fig. 1—Plan of Present Building and Proposed Extensions. The letters in the drawing refer to the following: A—Drilling machines; B—Special boring and facing machines; C—Grinder; D—Tumblers; E—Test benches; F—Second test; G—Office; H—Garage; J—Stock room; K—Power room; L—Toilet; M—Future cupola; N—New molding sand storage; P—Present core ovens; Q—Present core benches; R—Yard crane (which had not been erected when the photograph on page 805 was taken); T—Dust arrester. Heavy dotted outlines are buildings to be added at once; light dotted outlines are further in the future.

In the detail above is shown the relation of the jib crane and its bucket to the present and future cupolas and to the piles of coke, iron and limestone.

contact, there being a nipple opening at each end. Setting the chaplets, therefore, is an operation calling for extreme care; they are set in the metal pattern and, after ramming, a lifter hoists the flask and at the same time raises wires through the pattern, which loosen the chaplets and prevent them from sticking to the pattern.

The cope and drag sections of the flask are identical and contain no bars except two lateral bolsters. These are bars with round heads which are laid in the mold when the flask is cast; inasmuch as the flask is poured around the bars, they are chilled against the flask casting. To prepare the floor sand for molding work, a motor-driven sand cutter, made by the American Foundry Equipment Co., takes power from sockets provided in all of the columns and in the walls of the plant.

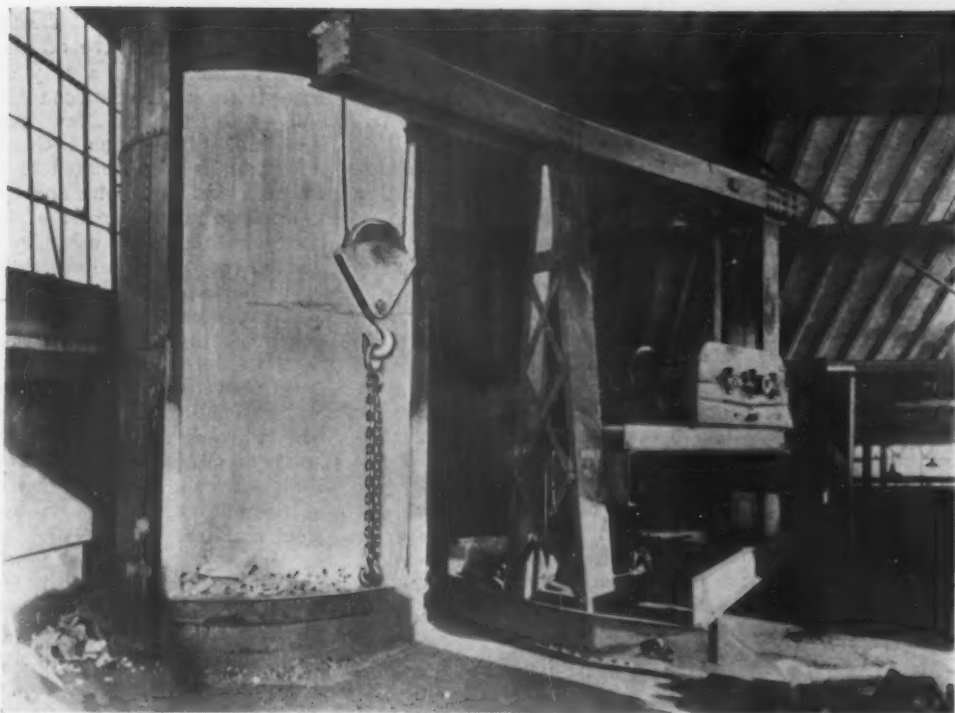
For pouring, the molds are stacked three-deep in a staggered position which exposes the gates, permitting each casting to be poured separately. The

in the system. Special trolleys, consisting of two pairs of wheels on swivels, make a rectangular turn on the monorail in an 18-in. radius.

In addition to having a monorail system, the plant is the first radiator foundry to be equipped with electric overhead traveling cranes, there being a 3½-ton Shaw crane in each of the three molding bays. These are used to distribute facing sand—almost a cubic yard per day being used on each molding floor—and, as previously pointed out, to handle cores. By the night gang they are used to pick up castings and to convey gates, sprues, etc., to the cupola.

This extensive material handling equipment permits a maximum economy of working space. There are no longitudinal gangways and only two running laterally. The overhead cranes take all castings to a battery of six Whiting tumbling barrels at the middle of the building. After the heads of the chaplets have been chipped off, the castings are charged into the tumbling mills. There are practically no fins on the

Fig. 3—A Motor-Driven Jib Crane Is Used to Charge the Cupola. A complete charge of coke, iron and limestone is made up, weighed and discharged into the cupola by drop-bottom bucket



castings, because of the pinch molding practice previously described. The use of tumblers is unusual in a radiator foundry, where the common practice is to brush the castings. The Niagara company, however, believes that tumbling gives the best results, crushed manganese steel being used as an abrasive.

Dust is carried away through underground pipes by a dust arrester, furnished by the W. W. Sly Mfg. Co., Cleveland. The first chamber of the arrester has steel baffles which remove all heavy particles, and in the second and third chambers dust is caught by cloth sheets. The cleansed air is then discharged back into the building—an essential feature of the scheme, particularly in winter, to prevent cold air from being drawn in through every crack to take the place of the air expelled. At the same time, the returning air sets

up a desirable circulation. The air from the arrester, furthermore, is thoroughly cleansed. A freshly laundered handkerchief held at the mouth of the discharge duct will show no discoloration.

Almost one-half of the plant is now devoted to machining, testing and assembling operations. A motor-driven carborundum double-ring wheel grinder, built by the Gardner Machine Co., Beloit, Wis., grinds the gates from the castings, and any fins which may be discovered. Two special machines, furnished by O. Bryant & Sons, Buffalo, bore and face the hub and machine the "steam-lock" lugs which space the top of the steam radiator units. In these operations, both sides of the casting are machined at once. The steam or water connections on the end castings are tapped by collapsible taps, furnished by the Murchey Ma-

Fig. 6—Molds are Stacked Three Deep in a Staggered Position which Exposes the Gates so that Each Casting May Be Poured Separately. The stacks are arranged in a double row, the gates being turned toward the intervening aisle, which is directly under an overhead monorail

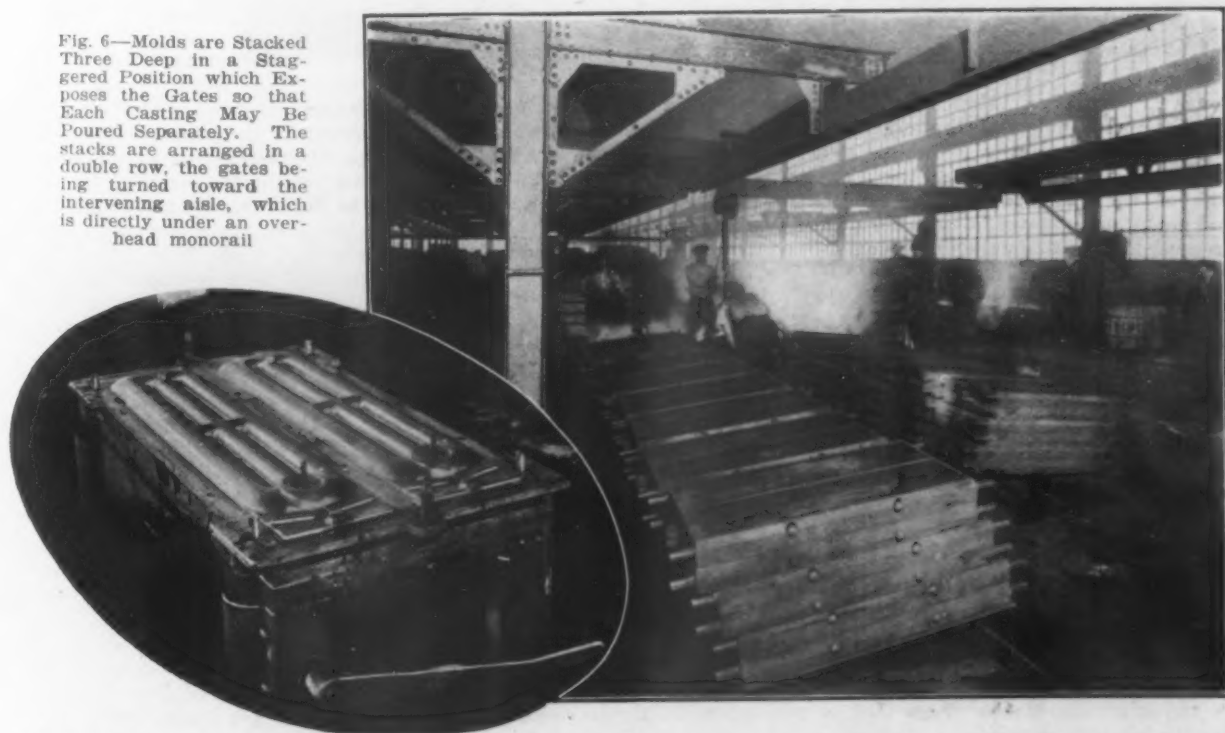


Fig. 5—Both the Cope and the Drag Are Rammed from a Single Metal Pattern. (See oval.) The joint surface of the pattern is machined down 0.012 in. to permit the edges of the cope and drag to pinch and thereby prevent fins. The chaplets are set in the pattern; after ramming, a lifter hoists the flask, and at the same time raises wires through the pattern, which loosen the chaplets and prevent them from sticking to the pattern

chine & Tool Co., Detroit, in a double spindle drill built by Baker Bros., Toledo. The air vents in the end castings are drilled and tapped in an Avey double-spindle drill, made by the Cincinnati Pulley Machinery Co. The air vent of a hot water radiator is near the top of the casting, as air is lighter than water. It is toward the bottom of a steam radiator, as air is heavier than steam. Only the end or leg castings of a radiator are tapped for air vent and pipe connections.

The radiators undergo two pressure tests, the first on a test bench, one unit at a time, the second after the units have been assembled into radiators. A 4 x 6-in. cylinder triplex pump, built by the Goulds Mfg. Co., Seneca Falls, N. Y., with control furnished by the Electric Controller & Mfg. Co., Cleveland, maintains the testing pressure for both tests. The pressure gage control starts the pump at 105 lb. per sq. in. pressure and stops it at 120 lb., so that a pressure of from 105 to 120 lb. is assured at all times. In the test bench the radiator casting is held tightly at both ends by a special cast C-clamp, one side of which is cored out to admit water to the casting. When the radiator is assembled, the test is made by connecting hose at one end. Water which has passed through the radiators goes to a sump with filter wall, from which it is returned to a storage tank for re-use.

All radiators made at the Chicago plant are of the

crane runways are 78 ft. apart, one of them being supported on the eave of the plant, so that the crane passes directly over a projecting portion of the charging platform. A railroad siding runs into the material yard from the New York, Chicago & St. Louis Railroad. The Illinois Central right-of-way is also near by. Iron is hoisted to the charging platform by magnet, and limestone and coke by bucket. The coke is dropped in one corner of the platform, and the iron and limestone in the other, so that the materials extend toward the center, where they can be shoveled readily into a charging bucket. A complete charge, made up of coke, limestone and iron, is weighed before being dropped into the cupola. The scale platform has been sunk 30 in., so that the top of the bucket is about level with the floor. This facilitates shoveling material into the bucket, which is of the drop-bottom type, and is swung into the cupola by the jib crane. A 10-hp. motor is used for hoisting, and a 3-hp. motor for the jib travel. The weighmaster, who stands in front of the bucket scale, is protected from the wind by a steel monitor.

Molten iron from the cupola is distributed by hand-pushed ladles, suspended from the monorail. The monorail system is so arranged that there is no interference between outgoing and returning ladles; ladles going to any one of the three molding bays take a



Fig. 4—In Making a Core, Two Core Boxes Placed Side by Side are Rammed and Struck Off, Following Which One Box Is Rolled Over Onto the Other. The top box is then removed, and the lower box, now serving as a core dryer, is transferred to a rack

"push nipple" type. Malleable iron nipples are placed in the nipple holes of the castings, which are then squeezed together over the nipple by a double-cylinder hydraulic press. Rods are then passed through the ribs of the castings and bolted tight at the ends, making a complete radiator. There are two hydraulic presses, both built in the equipment department of the company at North Tonawanda.

Iron is melted in a No. 10 Whiting cupola having a shell of 96 in. outside diameter and a capacity of 20 tons an hour; but with present floor space the foundry is able to use only 60 tons of metal daily, which means two cars of finished radiators per day. A Connersville blower, driven by a 75-hp. General Electric Co. motor, delivers 45 cu. ft. of air per revolution, and can be run, through several sizes of pulleys, at from 180 to 220 r.p.m. A flow meter furnished by the Bacharach Industrial Instrument Co., Pittsburgh, calibrated up to 12,000 cu. ft. per min., measures the blast; ordinarily about 8000 cu. ft. per min. is used. A gate has been provided on the main blast pipe so that, when a second cupola is installed, the blast may be diverted from one cupola to the other as desired. A Whiting Corporation 10,000-lb. motor-driven jib crane is used to charge the cupola. It is centrally located on the charging platform, so that it will serve both cupolas when the second is installed.

Coke, limestone and iron are delivered on the charging floor by a 10-ton overhead electric traveling crane, built by the Erie Steel Construction Co., Erie, Pa. The

lateral runway along the middle gangway of the foundry, from which they turn onto the proper longitudinal runway. After pouring, the ladles are passed to another lateral runway connecting the longitudinal runways near the end of the building. On this connecting rail, they pass across the plant to a separate return longitudinal runway which carries them to a loop, around which they turn until they are again in position in front of the cupola. Nineteen molding floors are served in this fashion but eventually, when the core room and the assembly shop have been removed from the present building, there will be 54 floors.

Very careful analysis of raw materials is necessary, because radiators must have a close grain iron which will hold water readily, and will also machine easily. The importance of the machining qualities of the iron is apparent when it is realized that from 1500 to 1600 castings must be bored and faced in nine hours. For analyzing pig iron, coke, coal and sand, a chemical laboratory has been provided in space above the offices, at one end of the building.

New molding sand is stored in a concrete tank, with a capacity of six cars, located at about the middle of the foundry under the yard crane. Adjoining it on the inside of the building is a mixing plant and overhead a steel storage tank for facing sand, from which the sand is drawn through a hopper into boxes equipped with casters. When filled, the boxes are rolled under the overhead cranes and distributed to the various molding floors.



Fig. 7—Use of Tumbling Barrels Is Unusual in a Radiator Foundry, the Common Practice Being to Brush the Castings. Crushed manganese steel is used as an abrasive in the tumblers

Another concrete tank, on the same side of the building, to have a capacity of 40 cars of core sand, is a part of the plan for the construction of a new core department, which is about to go ahead. This tank will be roofed over and will be filled by the yard crane through hatchways. Steam coils arranged around the walls of the tank will prevent the sand from freezing. The storage capacity was calculated so as to carry the plant through the cold months of December and January, when it is ordinarily difficult to obtain fresh supplies.

Saw-tooth roof construction, with continuous sash on the sides of the building, insure excellent light both from above and the sides. Heat is supplied by two cast iron boilers of the company's manufacture, located in a basement adjacent to the raw material yard. Each boiler has 14,500 sq. ft. of heating surface, they being the largest ever made by the company. Of the side-feed type, they have eight fire doors. A vacuum system of heating is used, the condensation of the radiators being pumped back to the boilers by pumps furnished by the Nash Engineering Co., South Norwalk, Conn. A concrete coal storage bin serving the boilers is filled by the yard crane.

The present shipping floor is at the assembly shop end of the building, and rail shipments go out on the same siding which brings in raw materials. When all of the proposed extensions are built, however, there will be an uninterrupted progress of materials from the raw material yard to the foundry, the machine shop, the assembly shop and the assembled storage, where another railroad siding will be provided for outgoing shipments.

While the Niagara foundry is a production plant, its varied output calls for considerable flexibility in operations. Ten separate types of radiators are manufactured, in 34 different heights.

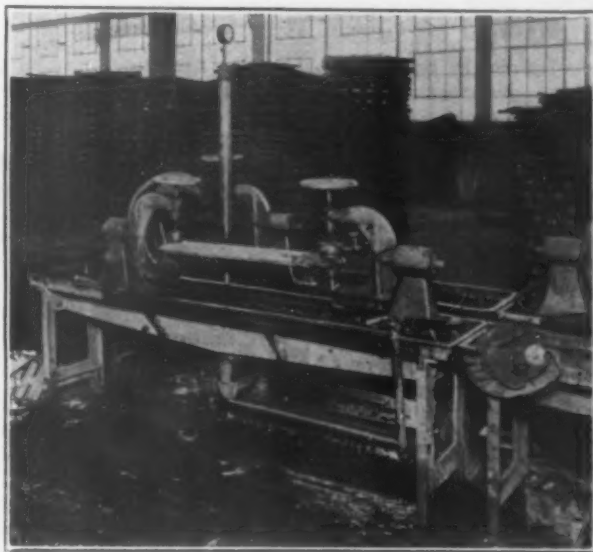


Fig. 8—Radiators Undergo Two Water Pressure Tests, the First One on a Test Bench—One Casting at a Time. The casting is held tightly at both ends by a special C-clamp, one side of which has been cored out to admit the water for the test pressure



Fig. 9—All the Radiators Are of the "Push Nipple" Type. Malleable iron nipples are placed in the holes of the castings, which are then squeezed together over the nipples by a double-cylinder hydraulic press

Business Group Meetings Will Feature Chamber of Commerce Convention

While transportation and European problems as they affect American business will be the general topics considered at the eleventh annual meeting of the Chamber of Commerce of the United States in New York, May 7 to 10, a group session will be held for each cross-section of American business. In the domestic distribution group, major topics will be "Railroad Rates in Their Relation to Distribution," brought down to individual application in discussion under the heads of "Store Door Deliveries and Collections" and "Transportation Obstructions to Distribution." In the fabricated production group, "The Effect of Freight Rates on Manufacturing Costs" ties up with the main theme of the annual meeting, and "Setting Up Quality Standards in Commodity Production" gives opportunity to expand the application to wasteful varieties, a problem long before American manufacturers and with a direct bearing on transportation costs.

The foreign commerce group meeting plans to get at the direct application of Europe's tangled affairs to American business, starting off with the rubber crisis and taking up the American manufacturers' viewpoint of world affairs in such matters as cotton exporting, the petroleum production situation over the world and like aspects.

Medical Service in Manufacturing Plants

Dr. F. E. Schubmehl, General Electric Co., Lynn, Mass., was the speaker of the evening at the March meeting of the New England Foundrymen's Association, held Wednesday evening, March 14, at the Exchange Club, Boston, approximately 70 members and guests attending. Dr. Schubmehl's address was directed mainly to statistics showing the results of medical activities in industry and their relation to the foundry, but confined largely to the General Electric Co., Lynn plant. He said the company has made notable strides in increasing production in recent years by the introduction of proper lighting, especially in relation to bench work of all kinds.

The company, through its medical staff, makes it a practice to examine all employees engaged in sand blast work every 30 days for the purpose of ascertaining whether workers have accumulated enough dust in lungs to warrant being placed on some other work until the defect is rectified. In relation to proper lighting, Dr. Schubmehl admitted that while the General Electric Co. is one of the leading exponents of light, it has not obtained the best working results under proper lighting facilities until fairly recently. On bench work, for instance, where girls are employed on certain work, by a proper arrangement of lighting, the number of employees had been reduced 50 per cent while production had increased that much.

It is proposed that the members of the New England Foundrymen's Association shall visit the General Electric Co.'s Lynn plant instead of holding the usual May meeting in Boston, and that in June some of the Worcester, Mass., plants will be visited.

Engineers Visit Watertown

Some 200 members of the Boston section American Society of Mechanical Engineers and affiliated technical societies, cooperating manufacturers and local reserve corps officers, on Friday afternoon and evening, March 16, were the guests of Col. Tracy C. Dickson, commanding officer Watertown Arsenal, Watertown, Mass., and the staff of the arsenal. The visit was arranged by Capt. L. P. Crim, Boston District Ordnance Office. Maurice M. Osborne, Boston, headed the committee in charge of the engineers.

At the foundry a demonstration of a new electric furnace was given by Maj. H. C. Hinton. Later, after visiting the woodworking department, Dr. F. C. Langenberg gave a talk on radio photographic examination of metals, using a newly installed X-ray machine, capable of penetrating 4 in. steel. Colonel Dick-

son explained the operation of a 16-in. gun in the directing shop.

Following a buffet supper, Brig.-Gen. W. S. Peirce, assistant chief of ordnance, gave an address on industrial war plans of the Ordnance Department. He said that warfare material has steadily grown in importance and complexity, so that the problem of providing great quantities of the many mechanical devices equals that of developing man-power. "It may be safely said," he explained, "that the first twelve months of a war must be fought with the stock of munitions on hand at the time of declaration. No appreciable quantities of munition can reach the front before the end of that period."

The world war showed the industrial resources of this country can be marshaled to advantage, but could not be handled from a central point.

French International Foundry Congress

The American Foundrymen's Association committee on international relations has sent out an announcement of a proposed trip to the French International Foundry Congress and Exposition at Paris, Sept. 12, 13, 14 and 15, 1923. The announcement offers two itineraries for the trip over. The first one proposes leaving New York Aug. 18, arriving London Aug. 25. Seventeen days would be spent in England visiting industrial centers and places of historical interest.

Itinerary No. 2 proposes leaving New York Aug. 25, arriving at London Sept. 1, with a reception to be given in the evening of that day, and then spending 10 days in touring England. Whichever itinerary is chosen, the date for leaving London for Paris will be the same, Tuesday, Sept. 11.

The official reception at the Paris convention will be held on the afternoon of Sept. 12, with a session in the English language on Thursday morning and banquet on Friday evening. An exposition will be held in Ecole des Arts et Metiers (Arts and Trades School), and is to be open from Sept. 6 to 14. American manufacturers of foundry equipment are invited to make exhibits. Information regarding exhibits can be obtained by writing to the Association Technique de Fonderie, 10 Rue de Lanery, Paris.

Following the French Congress and Exposition, ten or eleven days will be spent in touring France, Luxemburg and Belgium, visiting industrial centers and battlefields, with a reception by the Belgian Foundrymen's Association at Liège. A strong committee has been formed among the London technical societies to assure the Americans a hearty welcome.

All arrangements for the A. F. A. party are being made by the committee on international relations, of which H. Cole Estep, London, England, is chairman, and Stanley G. Flagg, Jr., of Philadelphia, vice-chairman. All reservation forms and requests for information should be addressed to Stanley G. Flagg, Jr., Morris Building, Philadelphia. Mr. Flagg urges prompt reply, as it is very important that arrangements be completed at an early date in order that return passage may be secured. An invitation is extended to all foundrymen of the United States and Canada to join the party.

Successor to Bayonne Steel Casting Co.

Eastern Steel Castings is the corporate name of a company recently organized to acquire the Bayonne Steel Casting Co., Bayonne, N. J., also the new plant at Newark, N. J., built in war time for the American Brake Shoe & Foundry Co. for the manufacture of steel castings. The business heretofore carried on at Bayonne will be removed to Newark. The personnel of the organization is chiefly that which carried on the operations of the Bayonne Steel Casting Co. The plant at Newark has a capacity of 12,000 tons of open-hearth electric steel castings a year. There are three main buildings on an 80-acre tract. William D. Sargent is president, Arthur J. Singer, vice-president and treasurer, and among other directors are James S. Thompson, vice-president American Brake Shoe & Foundry Co., and Wesley G. Nichols, president American Manganeese Steel Co.

German Steel Makers on the Ruhr Outcome

Confident France Will Lose Most by Continued Occupation, But Predict Good Results from Cooperation on Iron Ore and Fuel

BY CAPT. GODFREY L. CARDEN*

BERLIN, GERMANY, Feb. 20.—Since the occupation of the Ruhr by the French I have had occasion to observe the possible effects of that move both on Continental iron and steel business and on our own exports. The forcing of a French-German combination operated by trained and experienced German industrialists and controlled from Paris has far-reaching possibilities.

The Germans all along have contended that France is more concerned with a control of the Rhine and Ruhr industries than with reparations. In this connection I have had an interview with Dr. Reichert, member of the Reichstag and general director of the Central Union of German Iron and Steel Industries. Dr. Reichert's statement was reduced to writing following a conference on Feb. 19. To understand its importance it should be borne in mind that all matters of industrial policy and public policy are controlled by the organizations in which the steel and iron industries are bound. Such organizations in Germany are strong in their management. I am giving extracts from Dr. Reichert's observations which relate to economic and industrial consequences of the Ruhr occupation:

"The consequences of the French invasion of the Ruhr district are not confined to western Germany. Before there were any limitations of traffic in the Ruhr and Rhine districts, both French and Belgians had been obliged to blow out dozens of furnaces and to shut down at steel works, owing to the German suspension of reparations supplies in coke. This proves clearly that France and Belgium are now and will be for some time to come dependent on German good-will.

German Plants That Are Not Shut Down

"On the German side only a few blast furnaces have been blown out so far. Part of the Westphalian and Silesian coke production still remains free for the furnaces of central Germany, while the blast furnaces on the coasts of the North Sea and the Baltic are still getting their coke from England. It will be more difficult, however, to supply the less important works in south Germany with coke if no fuel comes from Czecho-Slovakia and the Saar district. The ore question, however, and this refers to all blast furnaces, has been solved for about half a year through our own output and the arrangements for imports. The case is the same as regards scrap. However, there may be disastrous results (after the iron blockade has lasted several months) for unoccupied Germany, as 70 per cent of the iron and steel industry is within the territory occupied by the French and only 30 per cent is free. The case is different for the industries working up steel and iron. Of these 60 per cent are in free territory whereas only 40 per cent are in occupied territory. France is now trying to use this situation to force Germany to her knees. But Germany has great assets in iron, with import possibilities from the Saar district, from Luxemburg, Austria, Czecho-Slovakia, Poland, Sweden, England and last but not least from the United States. The extension of importations and the maintenance of employment, therefore, depend to a large degree on payment and credit. England has already granted large credits and Czech business is likewise going on briskly.

"The loss incurred by German industry through the disorganizing methods of the French and the Bel-

gians will work to the advantage of the other iron countries of the world; likewise, the loss incurred by French and Belgian industries through the non-delivery of German coke will benefit other mining countries. It is quite obvious that English trade is enlivened. The number of unemployed people in England is diminished. The Americans might also claim to profit by the Ruhr occupation, in that they are getting business which would be given to Europe under different conditions. They now receive Dutch, Spanish, Danish, Swiss and other orders, thus adding to the favorable market conditions in the United States.

Shipments of Wabana Ore Stop

"It is a question whether France or Germany will suffer the greater loss. It is certain that neither will be able to endure this state of things much longer. The inflation of notes does not increase the purchasing power of the population; it only tends to add to their misery. Germany today is able to buy only what she really wants for her daily bread and employment. An interesting example is before us: Germany cannot continue to buy Wabana ores from Newfoundland after April, 1923, and thousands of miners there may be thrown out of employment.

"The destruction of the German economic machine is all the more deplorable since the Germans through many centuries have established a strong position both as purchaser of raw materials and as manufacturer of industrial goods.

What French-German Cooperation Might Do

"Neither France nor any other country can be interested in destroying the German machinery of production. It is, therefore, advisable to come to a peaceful understanding rather than to view the possible end of this Ruhr dispute. For it is an established fact that France has not sufficient personnel or experience to direct and carry on the complicated and enormous organism of the Ruhr district or further exploit it. When we contemplate the possibilities in the production of France's ore riches when combined with German coal mines, and the great number of workmen ready to work—all accustomed to discipline and modern organization—such a combination under the management of experienced German industrialists would mean a German-French mining industry which might well endanger England's world position in that line and go so far as to spell loss to American exports. One has only to consider the poor life of German laborers as a result of the Versailles Treaty, the fact that the German mines are only a few kilometers distant from French ore supplies, and the excellent lines of communication by railroad and water, to see what low costs could be reached. Under such a combination it would not be necessary to have an export premium such as France now pays in order to command foreign markets.

"The world cannot look idly at the destruction of Germany, nor would it consider a Continental iron and coal trust under French management desirable. The effort was made at Versailles to find a new industrial balance for the European Continent by giving to France the whole of the Lorraine ore fields and depriving Germany of the greater part of her ore, while leaving her a great part of her coal mines. This plan of dividing raw material and production was agreed to at Versailles and is now obstructed solely by France and Belgium. To this encroachment the formerly allied powers cannot possibly agree, since international traffic

*Previous articles in the series Captain Carden is writing for THE IRON AGE from observations on a European trip which began in January were entitled "Present Plight of German Shipbuilding" (issue of Feb. 15, p. 472) and "Today's Products of the Krupp Plants" (issue of March 15, p. 758).

cannot endure in the long run a continued violent disturbance of the iron trade in the Ruhr district and on the European Continent."

Plans of German Steel Makers to Meet the Situation

I am able also to give the views of the Northwest Group of German iron and steel manufacturers (Nordwestliche Gruppe des Vereins Deutscher Eisen und Stahlindustrieller) as expressed by Dr. Beumer for that association. The greater number of the plants making up this group are located in the Ruhr and in occupied territory on the Rhine.

"Although France," says Dr. Beumer, "is always asserting that the present occupancy of the Ruhr has no military character, and that the French will refrain from any disturbing interference in the economic life, the fact remains that a strong military control was established over all the people. Because of the unexpected obstinacy encountered as a protest from all the people, the French issued a prohibition on exports of iron and metal of any kind and under any form.

Railroad Paralysis the Main Factor

"But these prohibitions are of no importance since the paralysis of the traffic lines renders the transportation of coal and iron from the Ruhr to unoccupied Germany entirely impossible. On Feb. 13 traffic on Ruhr railroads ceased and French efforts to help out with their own personnel have come to nothing. The French purpose to control all railroad traffic will not be successful.

"A traffic so complicated as that in the Ruhr cannot be easily handled, Dr. Beumer thinks, even disregarding the fact that the French may not have at hand the necessary number of men for maintenance and the further fact that the railroad equipment is different from what they are accustomed to. He concludes that all traffic will soon stop within the newly occupied territory, with the result that the Ruhr basin will be entirely cut off from the rest of Germany.

"How systematically the French are accomplishing this isolation," says Dr. Beumer, "is proved by the recent occupation of Wesel and Emmerich. They now have in their grasp the important railroad line for the routes, England-Holland-Hamburg-Berlin. Up to now this line was the only important one that was free in the Rhine-Westphalian communications. But they have taken possession of the Lippe exit, port Wesel and the large frontier port of Emmerich. This last gives them customs control and the definitive supervision of the in and out transport between Germany and Holland, as well as to England, Scandinavia and other overseas countries."

Unoccupied Districts Adopt Counter Measures

Asked as to the effect of these enforced measures upon the economic life of the occupied territory and upon unoccupied Germany, Dr. Beumer said: "Doubtless the French wish to starve the unoccupied territory, paralyze all industry, and in this way break the resistance of the Government and the people. For the industries of the unoccupied territory the coal question is not so serious, even if, in consequence of coal shortage, some enterprises may be forced to close down. With the delivery of so-called re-established coal, the general requirements can be considerably supplied. The coal miners, in view of the seriousness of the present situation, are now working overshifts, and this intensive working will continue until the crisis ends.

"The brown coal miners of Central Germany are working night and day in three shifts, inclusive of Sundays. In the Lower Silesian pit-coal mines the miners have added for each shift one overtime hour, and similar action is being taken in nearly all other coal territories. The Government railroads are using English coal, as are also some of the industrial works, especially the maritime works. Considering that only one-sixteenth of the Ruhrland mines are situated in the unoccupied territory, it is clear that the economic

life of unoccupied Germany can be maintained only through recourse to the auxiliary fuel. The same is true in providing unoccupied Germany with iron and steel products for working up. The export prohibition is directed against the industries of such territory which depend so largely for their iron and steel requirements on the Ruhr region. In future it will be impossible to transport iron and steel products into unoccupied Germany from the Ruhr.

"While this prohibition on exports will have a bad effect, yet the industries were not taken by surprise and up to the last all possible deliveries were made from the Ruhr, so that there is more iron and steel in unoccupied Germany now than ever before. In competent circles it is believed that the iron provision for unoccupied Germany will suffice so long as the Lothringen [Lorraine] works can hold out against a coke famine.

Drawing on Other Districts

"It must not be overlooked that other producing territories will be drawn upon, as Upper Silesia, middle Germany, and the coast works. By securing English coal the pig iron and steel outputs can be maintained in a satisfactory way. Finally, the foreign countries will not overlook the opportunity to send iron and steel to Germany. In particular, recourse can be had to Czecho-Slovakia, whose industry, in consequence of the high rate of the domestic kronen, is in a difficult position and would be glad to make deliveries to Germany. The same statement holds true with reference to Austria.

"The situation in the newly occupied territory is not wholly favorable. Because of the occupancy, the coal requirements have diminished, but the stopping of the delivery will mean the piling up of the coal in workings as a result of the closing of leads, and with it will come a gradual paralyzing of the mine work, making impossible all further coal handling.

"It all comes down to the question of how long the German industries can keep going. The monetary question has to be considered, and it means that the enterprises must sacrifice millions in supporting their independence. Only by doing so can work be continued. It means that coal must be imported, as well as working stock, and that a sufficient quantity of work must be at hand at all times. The entire industry is greatly dependent on the restoration of a regular traffic in the Ruhrland.

"But," concludes Dr. Beumer, "if even the worst happens, the strong and firm will of the German people will still remain. Precautions were taken that the workmen in case of unemployment would receive the necessary food, and that small enterprises be kept going. So the unity of the people will not suffer."

Trademarks; Trade Names; Unfair Competition

In a 48-page pamphlet issued by Richards & Geier, 277 Broadway, New York, the subject of trademarks in the United States and in foreign countries is given attention, this being the third edition of the work. The booklet makes clear the proper use of trademarks and gives a number of examples of valid marks, as well as defining marks which are invalid. The questions of unfair competition and of duration of the right to use a trademark are taken up and discussed in some detail, as well as many other features of their use. Charges for trademarks in foreign countries are tabulated.

Domestic sales of oak leather belting reported by the Leather Belting Exchange for February, and representing about 60 per cent of the total product, amounted to 438,006 lb. valued at \$814,692, or an average of \$1.86 per lb. This is to be compared with January's figures of 517,636 lb. valued at \$928,122, or an average of \$1.79 per lb., and with the sales of February, 1922, when the amount was only 314,054 lb. valued at \$524,157, or \$1.67 per lb.

Little Danger of Radical Bills Passing

Numerous Congressional Blocs Not Expected to Succeed in Their Plans—Much Agitation and Little Law Making Probable Features of Next Session

BY L. W. MOFFETT

WASHINGTON, March 20.—Forecasts of legislation at the next session of Congress beginning in December are being made in increasing number. The admitted radical character of many of its members as the result of the political upset at the elections of last November has given a certain added allurements, if not enjoyment, to the practice of predicting the legislative trend. There are those who have figured out that the radicals will occupy a position of dominance. On its face the calculation is quite simple and logical. But politics is so capable of taking such sudden and unexpected twists that calculations regarding them often go awry. There can be no reasonable doubt that the next Congress will be surfeited with perhaps more radically sweeping and freak bills of all kinds and complications than any previous Congress in the history of the country. While the business interests of the country should by no means treat the situation too lightly, at the same time it is possible to take it too seriously. Much, if not all, proposed legislation of this kind will be for political purposes, rather than any hope of its enactment.

Imaginary Power

The farm bloc, the organized labor bloc, the pacifist bloc, and all sorts of other blocs, probably will be striving to outdo themselves in an effort to show evidence of power and at the outset may imagine themselves to be closely associated and with identical interests. Were this actually to be the case, the radicals easily could sway legislation, but it is clearly seen that in many cases the so-called interests of these many blocs will be in frequent conflict and that they will be rendered much more nearly powerless than many imagine will be the case. As a matter of fact, there is disagreement among members of the farm bloc already. Senator Brookhart of Iowa has just come out with a screed to show that the recent Congress did nothing for the agricultural interests. At the same time, the leader of the farm bloc, Senator Capper of Kansas, issued statements showing the wonderful things that the recent Congress had done for the agricultural interests. The organized labor bloc has been comparatively quiet, but the fact remains that, for instance, its attitude on immigration is in sharp conflict with that of the farm bloc, the latter, like manufacturing interests, favoring liberalization rather than further restriction of the 3 per cent law. This is only a straw to show which way the wind blows. It merely is a forerunner to many probable conflicts among the blocs. Moreover, it is apparent that attempts to force through radical legislation may mean a union of conservative forces of the Democrats and Republicans.

Deadlocks Probable

With a probable course of this kind, it is easier to believe that the next Congress, rather than passing a lot of legislation, will be able only to attempt such legislation, and in fact will be deadlocked in many instances. Moreover, if legislation of a radical character should pass Congress, it is not to be forgotten that it would face a veto at the hands of the conservative Republican President and that his veto would find sufficient support in Congress to prevail. So, in the end, the country probably will be deluged with all

sorts of radical talk and attempted radical action in Congress, and perhaps will witness from that source and through the different selfish blocs a veritable orgy of political bigotry.

Revenue Legislation

In view of the foregoing, there need be no surprise at the statement of Senator Smoot, Republican, of Utah, who will be chairman of the Committee on Finance, and Representative Green, Republican, of Iowa, who will be chairman of the Committee on Ways and Means, that there probably will be no legislative relief from the present revenue laws. It is believed that Secretary of the Treasury Mellon will renew his recommendation in favor of a reduction of 25 to 30 per cent in the surtax rates, which now range as high as 50 per cent, but it is not believed that the recommendation will be given any favorable consideration. It is evident that there is a tendency among conservative Republic leaders in Congress, who will hold pivotal positions as heads of powerful committees, to discourage talk of reduction of any kind in taxes. It is generally conceded that the condition of the Treasury itself will not make this practicable. Back of this is the well-known fact that the different blocs not only will stand strongly against reductions in taxes for business interests, but on the contrary, it is plain that they propose among other things the restoration of high surtaxes and excess profit taxes.

The National Association of Manufacturers has already made this forecast. It also forecasts attempts at further legislation designed to promote the idea that Government ownership is the only solution for transportation difficulties; commissions to regulate and control the coal and petroleum industry and generally a system of licensed control for many or all forms of business.

The rather gloomy picture painted by the National Association undoubtedly is justified so far as attempts of radicals in the next Congress are concerned, but it has been pointed out that proposing is one thing and disposing is another. In other words, while business will be subjected to all sorts of attacks, which will have their harmful effects, it is not believed that the blocs will fare as successfully as they pretend they will.

J. C. Wicks, who has been district sales manager of the Brier Hill Steel Co. in Cleveland, together with R. D. MacKenzie and E. M. Updegraff, who have been associated with him in the Cleveland district, have opened an office at 1144 Hanna Building, Cleveland, under the name of J. C. Wicks & Co., and will do a brokerage business in iron and steel and will also do a wholesale business in coal. Mr. Wicks has been identified with the sales end of the sheet steel industry in the Central West for the past twenty years. He was connected with the Gary Iron & Steel Co. before it was taken over by the Brier Hill Co.

The 1922 payroll of the Newton Steel Co., Youngstown, operating a sheet mill property at Newton Falls in Trumbull County, Ohio, was \$1,223,476, compared with \$875,006 in 1921. The number of men employed average 748, against 614 the previous year.

Heavy Decline in Iron and Steel Exports

January Figures 20,420 Tons Below December—Ruhr
Influence Slight—Rails, Structural Steel, Bars
and Pipe Lead in Tonnage

WASHINGTON, March 20.—Iron and steel exports in January totaled 129,753 gross tons, as compared with 150,170 tons in December, a decline of 20,420 tons. The decrease in the January shipments, whose value was \$14,865,590, was not unexpected. The principal

Following are the countries to which the principal tonnages of exports of leading steel products were sent in January, 1923, and the seven months:

	Gross Tons	
	January, 1923	Seven Months Ended January, 1923
Galvanized Sheets:		
Canada	1,788	16,761
Philippine Islands	893	7,464
British India	669	2,330
Cuba	657	3,104
Colombia	470	2,188
Mexico	452	3,047
Black Steel Sheets:		
Canada	4,647	28,175
Japan	876	17,564
Tin Plate:		
Japan	2,538	10,137
Canada	1,801	10,871
Steel Rails:		
Chosen (Korea)	7,811	17,329
Honduras	2,239	4,541
Japan	1,978	48,737
Cuba	1,357	25,020
Canada	1,265	9,822
Mexico	1,243	4,283
Barbed Wire:		
West Indies	1,024	5,590
Australia	800	5,269
Colombia	652	3,694
Brazil	640	9,161
Argentina	592	7,138

Exports of Iron and Steel—Gross Tons

	January		Seven Months Ending January	
	1922	1923	1922	1923
Pig iron	1,043	2,482	15,543	19,572
Ferromanganese	121	46	413	424
Ferrosilicon	53	33	267	470
Scrap	4,585	1,663	19,503	20,509
Ingots, blooms, billets, sheet bar, skelp	4,683	10,563	10,891	60,505
Iron and steel bars	6,375	14,691	7,206	88,390
Alloy steel bars*	684	61	.....	1,843
Wire rods	6,438	1,696	56,428	9,829
Plates, iron and steel	2,801	7,848	63,845	50,308
Sheets, galvanized	16,058	7,600	34,165	52,850
Sheets, black steel	25,170	6,508	154,960	51,881
Sheets, black iron	1,985	1,002	.....	6,056
Hoops, bands, strip steel	2,468	2,675	10,612	20,297
Tin plate, terne plate, etc.	12,061	5,894	45,396	37,112
Structural shapes, plain material	4,196	10,943	67,728	57,057
Structural material, fabricated	3,859	4,892	5,809	56,350
Steel rails	29,670	16,583	114,628	139,189
Rail fastenings, switches, frogs, etc.	2,577	2,614	5,048	22,457
Boiler tubes, welded pipe and fittings	12,393	12,126	81,012	93,559
Cast iron pipe and fittings	1,235	3,125	14,579	33,120
Plain wire	8,237	5,170	23,744	49,455
Barbed wire and woven wire fencing	2,348	5,006	(b) 13,269	46,663
Wire cloth and screening*	98	167	.....	1,071
Wire rope and cable*	533	344	.....	2,945
Wire nails	6,575	2,131	18,383	17,873
All other nails and tacks	600	502	3,042	4,223
Horseshoes	62	76	325	724
Bolts, nuts, rivets and washers, except track	1,015	1,506	6,925	11,034
Car wheels and axles†	2,050	633	.....	9,260
Iron castings†	449	842	.....	5,798
Steel castings†	363	73	.....	1,028
Forgings†	120	258	.....	1,171
Total	160,905	129,753	775,706	973,026

*Not reported separately, prior to January, 1922.

†Previous to January, 1922, reported by value only.

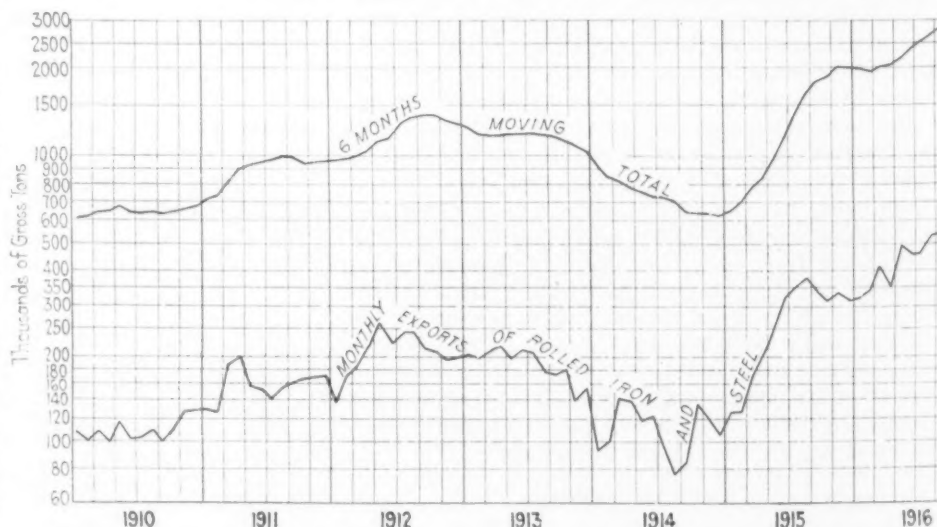
b—Includes barbed wire only.

reason assigned is the sold up condition of the American iron and steel industry in the domestic market and its lack of interest, under this circumstance, in foreign markets.

It is understood that a great deal of business offered from abroad has been refused. The decline in exports also is attributed partly to the situation in continental Europe, although occupation of the Ruhr and the consequent tying up of the iron and steel industry there is beginning to develop inquiries and in some cases light business for coal, coke and iron and steel, which ordinarily are drawn from that district. There also has been offering of business in other world markets, which have had to turn from the Ruhr plants to British and American producers. The Ruhr and general European situation, however, so far as it affects American iron and steel and machinery markets, is considered to have been over-emphasized.

For the seven months ended January, 1923, exports of iron and steel were 973,026 tons, valued

at \$103,350,029, showing a sharp gain over exports for the corresponding period of 1922, when they totaled 775,706 tons, valued at \$96,051,898. Exports in Janu-



Fluctuations Over Thirteen Years of the Monthly Exports from the

Despite the violent gyrations of the lower curve, which shows the month-by-month exports of rolled iron and steel, the movement of exports, considered over a longer term, has had only gradual change. Thus, in the upper curve, showing the totals for six months ended with the month plotted, the changes are far less abrupt than in the lower curve. The general contours

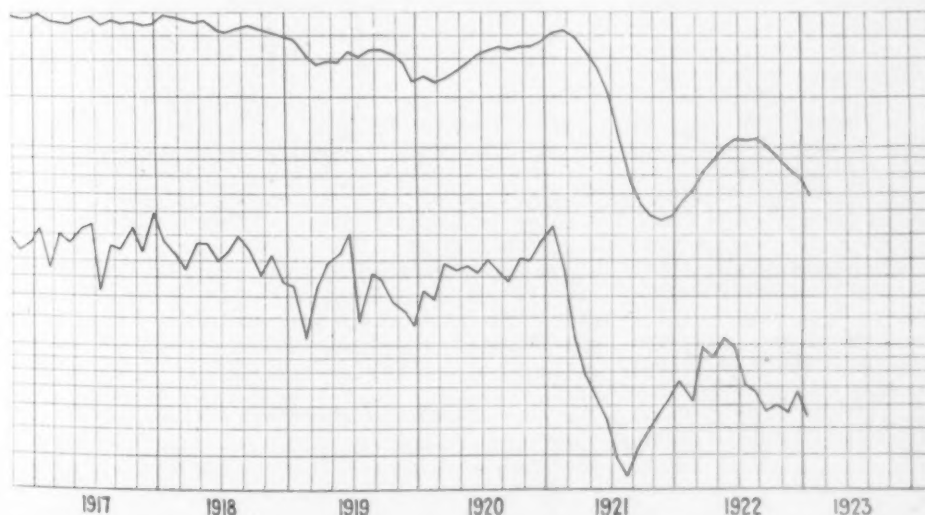
MACHINERY EXPORTS
By Value

	January, 1922	January, 1923	Seven Months Ending January, 1922	Seven Months Ending January, 1923
Locomotives.....	\$2,542,065	\$415,867	\$15,493,523	\$3,897,167
Other Steam Engines.....	244,752	225,975	891,780	1,317,888
Boilers.....	44,800	79,639	1,130,842	892,609
Accessories and Parts.....	214,218	255,100	.....	2,058,807
Automobile Engines.....	143,397	.....	877,060	1,910,857
Other Internal Combustion En- gines.....	463,555	122,194	2,654,585	2,499,281
Accessories and Parts for.....	225,089	216,772	.....	1,575,280
All Other Parts of Engines.....	70,964	.....	.....	*248,671
Complete Tractors, except Agri- cultural.....	206,725	764,048	.....	4,678,091
Electric Locomotives.....	26,431	880,909	.....	1,791,564
Other Electric Machinery and Apparatus.....	833,313	804,528	11,377,970	3,657,816
Excavating Machinery.....	41,554	93,706	.....	723,748
Concrete Mixers.....	27,567	23,624	181,202	331,121
Road Making Machinery.....	13,206	20,434	.....	239,597
Elevators and Elevator Ma- chinery.....	108,863	105,900	.....	933,555
Mining and Quarrying Machinery	187,852	241,374	.....	1,025,540
Oil Well Machinery.....	229,008	569,673	.....	1,527,539
Pumps.....	492,097	617,220	3,258,636	3,868,869
Lathes.....	64,316	58,683	707,001	433,065
Boring and Drilling Machines...	84,435	57,922	84,435	329,297
Planers, Shapers and Slotters...	20,508	15,965	20,508	163,994
Bending and Power Presses....	74,698	23,205	.....	97,444
Gear Cutters.....	8,104	5,550	.....	83,826
Milling Machines.....	14,599	65,597	.....	285,089
Thread Cutting and Screw Ma- chines.....	11,373	28,963	.....	154,540
Punching and Shearing Machines.	6,804	34,902	.....	84,494
Power Hammers.....	14,568	7,960	.....	82,533
Rolling Machines.....	172	.....	.....	136,851
Sharpening and Grinding Ma- chines.....	43,296	70,233	490,508	511,435
Other Metal Working Machine- ry and Parts of.....	456,081	392,259	4,785,002	3,560,964
Textile Machinery.....	1,295,178	666,287	9,921,404	5,848,842
Sewing Machines.....	334,624	638,644	3,234,466	5,195,276
Shoe Machinery.....	71,255	85,456	611,703	682,282
Flour-Mill and Gristmill Ma- chinery.....	31,758	113,013	428,297	679,981
Sugar-mill Machinery.....	145,099	244,946	3,350,233	2,865,347
Paper and Pulp Mill Machinery...	248,953	211,564	1,625,027	948,250
Sawmill Machinery.....	142,063	36,603	306,173	321,827
Other Woodworking Machinery...	83,598	83,206	601,715	951,973
Refrigerating and Ice Making Machinery.....	215,155	234,417	968,914	1,027,471
Air Compressors.....	73,803	155,467	1,054,765	1,358,668
Typewriters.....	707,747	1,220,106	5,175,954	6,865,902
Power Laundry Machinery.....	11,011	12,722	128,273	109,938
Typesetting Machines.....	151,224	219,751	1,519,279	2,004,837
Printing Presses.....	378,910	372,945	3,037,842	2,492,808
Agricultural Machinery and Im- plements.....	1,121,597	2,840,909	10,953,442	18,030,423
All Other Machinery and Parts...	6,350,821	7,778,094	61,937,535	54,854,795
Total.....	\$18,279,215	\$21,112,412	\$146,896,983	\$143,040,142

*July 1 to December 31, 1922.

ary, 1922, were considerably above those for the same month of the present year, being 160,905 tons, valued at \$15,130,290.

The greatest item of export in January, 1923, was



United States of Finished and Semi-Finished Rolled Iron and Steel

of the two curves are necessarily similar, but the sharp saw-tooth edges of the lower become smoothed out in the upper. And that the upper curve is a fair index of the shipments of iron and steel is shown by the way that curve responds to every major movement of the lower curve, such as the steady rise through 1915 and 1916 and the quick tumble in 1921.

steel rails, amounting to 16,583 tons, of which 7811 tons went to Chosen (Korea). The next greatest item was iron and steel bars, whose combined total for January was 14,691 tons. Along with a number of other

Exports, January, 1921, to January, 1923, Inclusive

	All Iron and Steel	Gross Tons Pig Iron	Semi-finished Material
*Average, 1912 to 1914...	2,406,218	221,582	145,720
*Average, 1915 to 1918...	5,295,333	438,462	1,468,026
Calendar year 1919.....	4,239,837	309,682	258,907
Fiscal year 1920.....	4,212,732	248,126	288,766
Calendar year 1920.....	4,961,851	217,958	216,873
January, 1921.....	547,394	3,710	315
February.....	393,328	1,307	92
March.....	230,635	2,320	1,023
April.....	162,592	1,234	678
May.....	142,551	2,541	749
June.....	119,081	1,689	1,106
Fiscal year 1921.....	4,168,619	129,541	82,549
July.....	86,523	2,744	363
August.....	75,827	2,424	2,447
September.....	95,169	3,078	1,318
October.....	106,582	2,830	153
November.....	125,511	1,299	1,869
December.....	134,415	2,550	250
Calendar year 1921.....	2,213,042	28,305	10,363
January, 1922.....	160,920	1,043	4,683
February.....	133,975	1,430	6,627
March.....	208,843	2,724	10,002
April.....	198,830	2,750	9,376
May.....	230,062	3,897	13,091
June.....	212,295	1,996	13,178
Fiscal year 1922.....	1,721,418	28,330	63,127
July.....	157,169	1,943	10,149
August.....	145,640	1,791	9,353
September.....	129,475	5,203	6,810
October.....	132,924	1,553	8,364
November.....	127,782	3,464	7,157
December.....	150,170	3,136	8,449
Calendar year 1922.....	1,986,297	30,922	107,201
January, 1923.....	129,752	2,482	10,563
Seven months.....	973,026	19,572	60,505

*Calendar years.

revisions that had been made in the iron and steel export table, the Bureau of Foreign and Domestic Commerce has again separated iron and steel bars, beginning with January, although for the seven-month period they necessarily still are consolidated. January exports of steel bars amounted to 11,391 tons, while iron bar exports were 3300 tons. The bureau also has eliminated the item machine screws and included it in other manufactures, because of the small tonnage involved (15 tons in January, 1922).

Exports of machinery in January for the present year were valued at \$21,112,412, as compared with \$18,279,215 in January of last year, and for the seven months ended Jan. 31, 1923, they were valued at \$143,040,142, as against \$146,896,983 for the corresponding period ended Jan. 31, 1922. The gain for January was 15.5 per cent over last year. For the seven months, there was a decrease of 2.6 per cent.

COST OF LIVING HIGHER

Fuel and Farm Products Decrease in February—
Other Items Increase—Total Advance 11
Per Cent in Year

Wholesale prices in February averaged one point higher than in December, November and January, according to information gathered by the Bureau of Labor Statistics, but were 11.3 per cent higher than in February, 1922.

Metals and metal products, as a group, advanced $4\frac{1}{2}$ per cent during the month, and reached a point 26.4 per cent higher than a year ago. THE IRON AGE composite price for pig iron, at mid-February, was 49.6 per cent higher than a year ago, and the composite for finished steel was 29.5 per cent higher than in February, 1922.

Metals stand liquidated 61.5 per cent of the 1920 peak price excess over 1913—that is, 61.5 per cent of that excess has been wiped out. This liquidation, a year ago, had reached 84.2 per cent, a portion of which has since been lost by price advances in nearly all items. "All commodities" have been liquidated 61 per cent, on the basis of the February figures; a year ago, it was 70.4 per cent.

Index Numbers of Wholesale Prices, by Groups of
Commodities
(1913 equals 100)

	1920 Peak	1922 Feb.	1923 Jan.	1923 One Year Feb. Per Cent	Advance in Per Cent
Farm products.....	247	131	143	142	8.4
Food, etc.	248	135	141	141	4.4
Cloths and clothing....	346	174	196	199	14.4
Fuels and lighting....	281	191	218	212	11.0
Metals and metal prod- ucts	203	110	133	139	26.4
Building materials....	300	156	188	192	23.1
Chemicals and drugs..	213	123	131	132	7.3
House-furnishing goods	275	177	184	184	4.0
Miscellaneous	208	117	124	126	7.7
All commodities.....	247	141	156	157	11.3

According to figures of the National Industrial Conference Board, New York, there was a decrease of 0.4 per cent in the cost of living as based on the average workman's family budget. The figure for Feb. 15 is given as 57.5 per cent above 1914, compared with 58.1 per cent Jan. 15.

Coal and Coke Production for February

WASHINGTON, March 20.—The production of by-product coke in February was 2,810,000 net tons, says the Geological Survey, as compared with 3,100,000 tons in January. A slight increase was shown in the average daily output. This was at the rate of 83.5 per cent of full capacity. Of the 71 plants in existence, 62 were in operation and 8 were idle. Despite the short month, the total output of beehive coke in February was more than in January, being 1,482,000 net tons, as compared with 1,478,000 tons.

It is estimated that the coke production in February required a total of 6,376,000 net tons of coal. This requirement is slightly in excess of the monthly average consumption during the active business year, 1920.

Present estimates of soft coal production for the week ended March 10 indicate a total output of 10,609,000 net tons including coal shipped, mine fuel, local sales, and coal coked. This is a decrease of 337,000 tons as compared with the revised estimate of 10,946,000 for the week preceding. Preliminary reports of cars loaded in the week, March 12 to 17, indicate a further decline in production.

American Industrial Growth Greatest in History

Based on a study of the census reports of manufactures for the past 70 years, the National Industrial Conference Board, New York, has called attention to the tremendous growth in industry which has taken place in the United States within the past two generations. The dollar value of products manufactured rose from 1091 millions in 1849 to 62,418 millions in 1919, a gain of 5621 per cent. Similarly, the number of

wage earners employed in manufacturing advanced during that period from 957,059 to 9,096,372, a gain of 850 per cent.

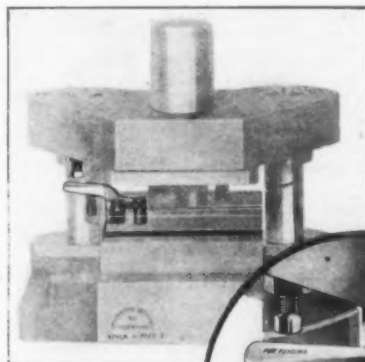
An increasing proportion of the working population has been drawn into manufacturing. Of each thousand persons engaged in gainful occupations, manufacturing, in 1899, utilized 182 against 260 in 1919. This growth of personnel in manufacturing and the effect of increased production on the standard of living are reflected in increasing expenditures for wages and rapidly mounting average costs. Labor in manufacturing industries rose from \$20.71 per month in 1849 to \$96.50 in 1919, an increase of 368 per cent, which figure may perhaps be taken as a gage of the decreased purchasing power of the dollar within the 70 years.

Mechanical power has far outstripped the number of wage earners, advancing from 2,350,000 hp. in 1869 to nearly 30,000,000 hp. in 1919. In the last 20 years the power used almost trebled, while the number of wage earners increased only 65 per cent. Other changes brought to attention in the report deal with the much shorter working week, the very heavy increase in taxation in proportion to the value of output, and the steadily growing movement toward corporate ownership of industries.

New Die Gage or Stop

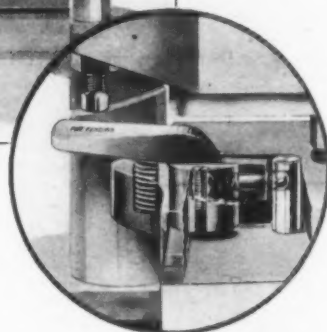
A die gage or stop constructed as shown in the accompanying illustration and applicable to almost any type of blanking die, either simple, progressive or compound, has been placed on the market by the Danly Machine Specialties, Inc., 1613 North Lincoln Street, Chicago.

In attaching the stop to the die it is necessary merely to drill three holes and plane or mill a groove $\frac{1}{4} \times 5/16$ in. long connecting two holes. The assembly



Die Gage Or
Stop for Use
With Blanking
Dies, Simplicity
of Attaching the
Device Being a
Feature

Details of the
Stop Are Shown
In the Insert



of the stop in the stripper plate is made by drilling two holes for the small screws which are provided for the gage. The parts of the stop are made of drop forgings and screw machine products and two small springs.

Piston Measuring Device

To measure the diameter of pistons for automobile and other similar engines, Robert L. Schnapp, 344 Cumberland Street, Brooklyn, N. Y., has placed upon the market an instrument under the name of OutSlide-Mike, graduated at one end in thirty-seconds of an inch and at the other end in thousandths of an inch, each in the ratio of the circumference of a circle to its diameter. The instrument, which is made of very thin cold-rolled strip steel, is wrapped tightly around the piston or other cylindrical surface to be measured and the diameter read off directly on the scale.

For measuring the inside of a cylinder an InSlide-Mike is being developed, which will be used in a similar way.

NEW GAS PRODUCER

Operation Fully Automatic—Capacity Increased New Construction Features

A new gas producer designated as type L No. 8, and offered as an improvement over the standard Hughes unit, has been placed on the market by the Wellman-Seaver-Morgan Co., Cleveland. A type L No. 10, of 10 ft. diameter and having the same features will also be manufactured.

The new machine is self contained and is automatic from coal feed to ash disposal. The poker action has been remodeled, the driving mechanism simplified and the ash pan arranged to rotate intermittently. A combined steam jet and turbo-blower in one unit has been



The Producer Is Entirely Automatic From Coal Feed To Ash Disposal. The arrangement of the mechanism is shown in view above, and the path of the poker tip during a 30 min. period of 5.88 revolutions of the producer, at the right. The position of the poker and application of the measuring rod are shown in the lower view

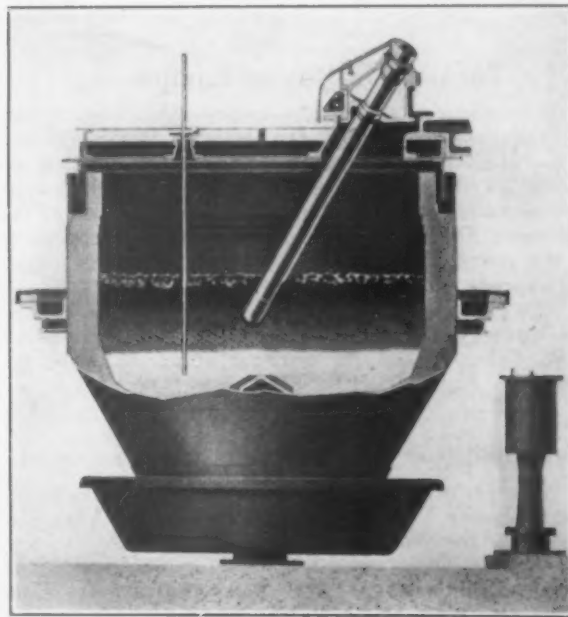
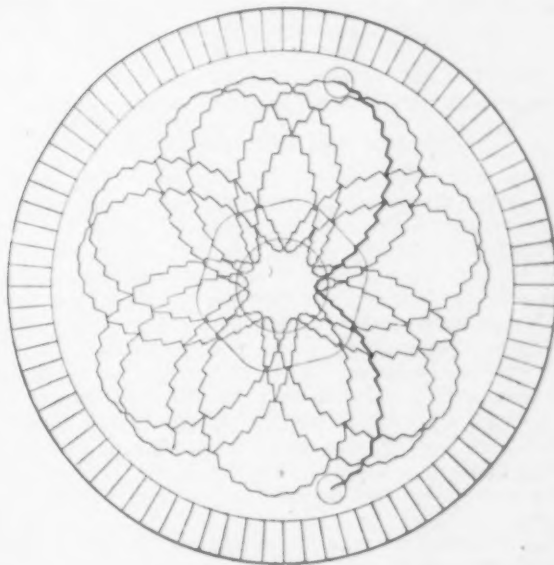
provided. Increased mechanical efficiency, increased gas-making capacity and more uniform quality of gas are claimed for the new producer, as well as elimination of clinkering of the brick lining, elimination of hand poking and reduced maintenance cost.

The gasifying capacity is said to be from 1500 to 2750 lb. of bituminous gas coal per hr. Using a bituminous coal having 30 to 40 per cent volatile matter, 50 to 60 per cent fixed carbon, with ash under 15 per cent, the latter fusing at 2200 deg. Fahr. or over, the producer is said to have an overload capacity of over 3600 lb. With an Indiana gas coal a steady high rate of gasification averaging over 2900 lb. per hr. with peak loads up to 4000 lb. is said to have been obtained. These results are attributed to uninterrupted automatic operation. The mechanical coal feed is the same as in the company's previous producers.

The oscillating water-cooled mechanical poker is an outstanding feature. It extends from the top down into the fuel and combustion zones as shown in the illustration and is said to relieve the gas man of all hand poking. The poker is inclined at an angle to the vertical, oscillating in a path which forms the frustum of a cone. It is mounted in a large circular bearing and has in its travel an upward and downward swing from the center of the producer to the brick lining of the shell and backward. The combined

actions of the poker are intended to keep the fuel free and loose, close any incipient holes, maintain a fuel bed of uniform density, prevent clinkering of the walls and force the incipient clinkers down into the ash zone.

Safety devices are provided for the poker. The bearing sleeve of the poker has a segmental gear on one side which meshes with a similar gear oscillating loose on a vertical shaft. The gear is driven through a "shear pin" connection with a crank keyed on the vertical shaft. In case any unusual resistance is encountered by the poker, this pin will release the drive and it can be replaced readily.



Water cooling and the use of a tip of special material are intended to prolong the life of the poker. From the latter the water is discharged onto the top plate and thence by overflow pipes to the top water seal and onto the ash pan seal. From 5 to 7 gals. per min. of water are said to be sufficient for all cooling purposes. The poker tip is a separate point of hard steel.

The company's steam injector blower and a steam turbo blower, either of which may be used as the fire conditions indicate, are incorporated as one unit in the new machine. This is said to permit of closer control of gas generation, effecting on the whole a more uniform quality of gas. The blast hood is a casting having conical sides, from under which the blast passes from the central duct into the ash zone. Ribs are provided on its upper surface to assist in the downward flow of the ashes to the ash pan. The hood and its

blast pipe are carried by the ash pan and revolve with it. The hood is designed to give an evenly distributed flow of the blast to the combustion zone.

Fires are measured by forcing a rod through the fire to the level of the top of the blower hood as in the previous design. The new producer has no cleaning or breaking down period. In addition to the bar testing, a $\frac{3}{4}$ -in. rod is used occasionally to note condition of the fire. If the bar test shows slight clinkering, it may be overcome by changing the amount of steam in the blast. In general, steam pressure greater than 40 to 50 lb. per sq. in. is said to be seldom necessary.

A saturation temperature of about 120 deg. Fahr. is used where the composition of the coal and its ash allow. This means that from 0.28 to 0.30 lb. of steam per pound of coal is used. A favorable coal is claimed to require but little steam and will make good gas.

Ash Pan Rotates Intermittently

The ashes are assisted in their descent from the combustion zone by the down stroke of the poker and the combined action of the hexagonal hood and the intermittent rotation of the ash pan. This action is said to have also the effect of crushing the clinkers that may be formed. Scraper blades supported from the lower water seal move the ashes to the outer edge of the pan where they come in contact with the ash plow which discharges them alongside the producer. The ash pan is carried on a ball bearing supported on a heavy cylindrical casting resting on the foundation. This casting also serves as a part of the blast duct. The ash pan rotates independently of the shell, being driven by the torque transmitted through the ashes.

The intermittent rotation of the pan is obtained by stop blocks which engage with an oscillating arm, which

derives its periodic motion from a cam and block in the producer drive. The ash plow is adjustable and can be raised or lowered into the pan at will.

The shell and top are of steel plate throughout and the water seals are unusually deep. The top plate is reinforced by angles which on the upper surface form a water-cooling pan to prevent over-heating of the plate, while the angle on the underside with extended plate projects into the water seal.

To the shell are bolted the main driving gear and track ring on a plane above its center of gravity. The track ring is of steel rail running on three rollers supported on the three columns, making the producer self contained. The bearing surface of the rail head and the treads of the wheels are in contact on a true conical surface. The track wheels are supported on substantial box brackets riveted to each of the columns. The producer top is covered with removable floor plates, access being had to all operating parts.

The producer is driven by a 3 hp. motor, although only $1\frac{1}{2}$ hp. is required, the margin being provided in case of accidental overloads. The motor is connected by a flexible coupling to a double worm and gear reduction which runs submerged in oil in a gear case mounted on the machinery column. The worms are of hardened steel and the worm gears of hard bronze; both are ground to correct tooth outline. The reduction gear shafts run in heavy duty radial and end thrust ball bearings, all parts being held in alignment without need of adjustment. Lubrication of all bearings except those of reduction gearing is by a forced grease system intended to prevent grit from entering the bearing.

A crank on the first worm wheel shaft operates the poker mechanism, coal feed and ash pan stop, while the main driving pinion is mounted on the second worm wheel shaft.

To Assist in Buying Equipment

WASHINGTON, March 20.—Incorporated recently under the laws of Illinois, the Railway Motor Finance Corporation held its first meeting in Washington on March 3 and elected officers and directors and has put into operation its plan of assisting member lines of the American Short Line Railroad Association and others in the purchase and operation of railroad, passenger and express motor car equipment.

The principal offices of the corporation are at 616-618 Railway Exchange, Chicago, its president being J. W. Cain, who is also manager of purchases of the American Short Line Railroad Association.

Complaint of Weirton Steel Co. Dismissed

WASHINGTON, March 20.—The Interstate Commerce Commission in a decision made public last Thursday, dismissed the complaint of the Weirton Steel Co., Weirton, W. Va., protesting against the rate on coke to Weirton from the Connellsville region. At the time the complaint was filed, the rate was \$2.52 per net ton, as against the present rate of \$2.27, the latter taking into account the general 10 per cent reduction effective July 1, last. The complainant had asked the commission to award reparation on all shipments which have moved since March 1, 1920, to the extent that the charges exceeded those which would have accrued from the rates applicable to the Midland, Pa., rate of \$2.10. The 10 per cent reduction, has brought the latter rate down to \$1.89. It is pointed out in the complaint that the Weirton Steel Co. is interested only in the rate from the Thompson No. 1 ovens of the Red Stone Coal & Coke Co.

The commission in its conclusion said that the defendant railroads, the Monongahela and others, expressed fear of the effect which the granting of the request of the complaint might have on the adjustment of coke rates. Weirton is included in the Wheeling group and it is stated that the railroads expected that

any reduction in the rate to Weirton would doubtless be followed by requests for reductions to other points in the Wheeling group, including Steubenville and Mingo Junction, Ohio.

Cottrell Blast Furnace Gas Cleaner at Pueblo

The Gellert Engineering Co., Philadelphia, has been engaged by the Colorado Fuel & Iron Co. to design a single-unit Cottrell electrical blast furnace gas cleaner which will be built for the Pueblo plant. The work is being done under the supervision of Wilfred Sykes, consulting engineer for the Colorado Fuel & Iron Co. The company has devised a special plan by which the Cottrell cleaning plants are considerably less expensive than before.

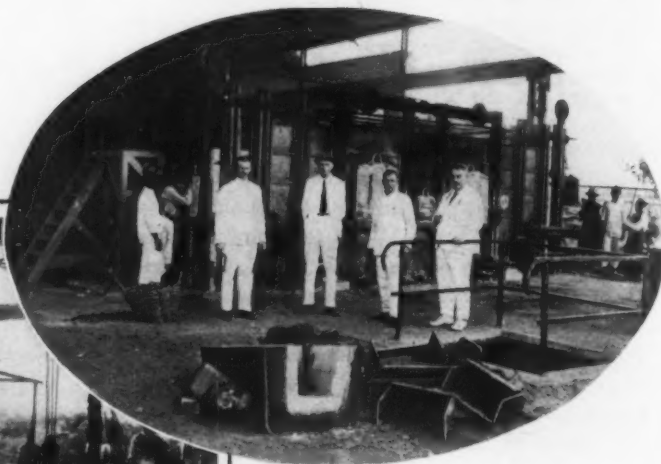
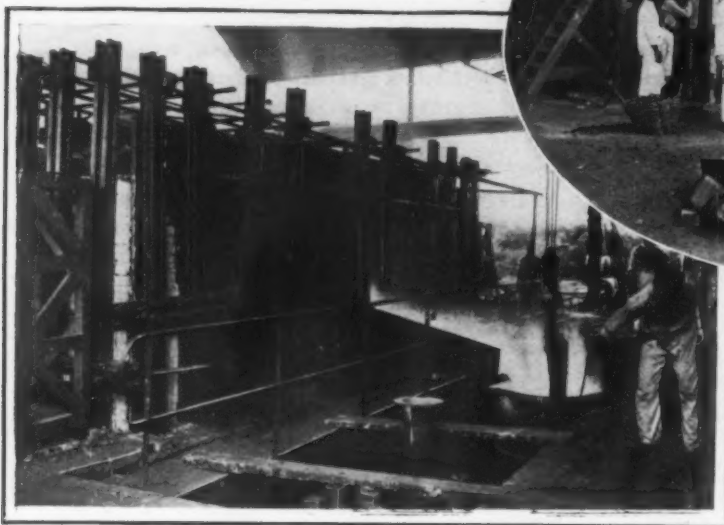
Due to the extension of its activities, the Gellert company has opened an office at Pittsburgh in the Oliver Building. L. S. Kerchner and R. M. Marshall both represent the company in that city.

The *Business Law Journal*, a new magazine intended for the use of business men, manufacturers, bankers, accountants, credit men, etc., has made its appearance. It is published at 71 Murray Street, New York, under the editorship of John Edson Brady, who since 1910 has been editor of the *Banking Law Journal*. In the February number are decisions dealing with questions pertaining to corporations, insurance, sales, contracts, banking, brokers, negotiable paper, mortgages, and so on, and the decisions of the Federal Trade Commission on unfair competition. Each decision is digested and explained. The subscription price is \$8 per year.

The Cutler Steel Co., Pittsburgh, plant of which is at New Cumberland, W. Va., is in production on its chromium iron alloy, known in the trade as duraloy.

MAKING STEEL IN JAVA

Open-Hearth Plant at Batavia Utilizing Scrap Principally for Railroad Castings—Surplus Sold Partly for Forging Work

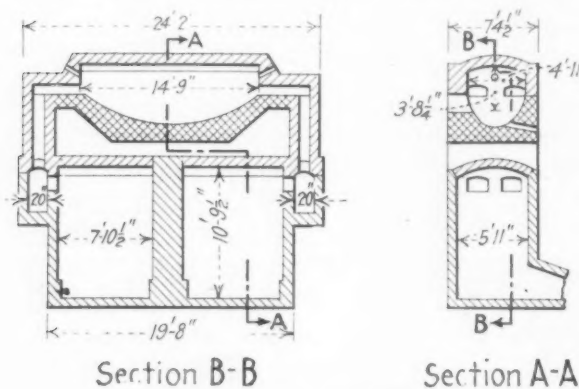


A 3-ton Oil-Burning Open-Hearth Steel Furnace at Batavia, Operated for One Heat per Day Owing to Lack of Help of Necessary Experience and Endurance

IN 1921 it was decided to build a small basic open-hearth furnace at Batavia, Java, to provide castings for the railroads, and the plant has now been completed. It is expected, however, to produce more than the railroad needs and the excess capacity will be available for private sale, including ingots suitable for forging. The design, construction and the putting into operation were in charge of a Russian engineer, Nicolaus N. Menshih. Up to this time no steel had been produced in the Dutch East Indies with the exception of that made by means of an oil crucible furnace built also by Mr. Menshih, who, incidentally, recently arrived in this country from Java.

The capacity of the basic furnace is put at three tons. It was designed to use oil as a fuel, supplied under air pressure from a blower. Fireproof building

two meltings were attempted, largely to test out the natives in respect to their strength and endurance. In the early period all melting was limited to 2 tons, although the furnace as stated is designed for 3 tons. The time required for melting is 3 to 4 hr. The quantity of oil used amounts to about 20 per cent of the charge. It is to be understood that the fuel figure covers the time from the beginning of charging to the moment of tapping. The experience is regarded as justifying the building of the plant. There is a large quantity of scrap available that is otherwise not used and in many cases it is obtained merely for the asking as a way of disposing of it.



Section B-B

Section A-A

Two Sections of the Furnace

material and the materials for operation, such as magnesite brick and ground magnesite, were brought from Germany, except fire clay, which was obtained partly from Java and partly from China. Ferromanganese and ferrosilicon were obtained from Germany. The plant is supplied with a 5-ton electric traveling crane.

The charge normally consists of 50 to 60 per cent iron scrap and the remainder cast iron scrap. What ore is necessary has been obtained in small quantities from Borneo.

The furnace has been operating in the day time only for the reason that it is impossible to get an experienced foreman for the night work and it would be difficult to find the necessary number of men who have had any experience in connection with the open-hearth furnace. Thus it has been the practice to run only one melt per day, although there was one occasion when

Tests of Large Boiler Using Powdered Coal

Tests of a large boiler fired with powdered coal were recently carried out at the Lakeside station of the Milwaukee Electric Railway & Light Co., by the fuel section of the U. S. Bureau of Mines, in cooperation with the research department of the Combustion Engineering Corporation, New York. The boiler tested has 13,380 sq. ft. of heating surface, and is one of eight boilers equipped with the Lopulco powdered coal system supplying steam to two 20,000-kw. steam turbines in the largest power house burning powdered coal. Twenty-six tests were run at rates of heat transference varying from 4000 to 8000 B.t.u. per square foot of boiler heating surface, and the mean thermal efficiency attained was about 84 per cent, based on the gross calorific value of the fuel as fired. The efficiency varied little with the rate of steaming, and its high value is accounted for by the small loss from incomplete combustion and the small amount of excess air, which varied from 5 to 36 per cent.

The coal burned had a gross calorific value of about 11,500 to 12,800 B.t.u. per pound, contained 2 to 5 per cent moisture, 33 to 36 per cent volatile matter and 9 to 13 per cent ash, and was so ground that 89 to 95 per cent would pass through a 100-mesh sieve. The ash had a softening point of 2150 to 2450 deg. Fahr., but did not fuse together at the bottom of the furnace, because it was partly protected from the flame radiation by means of a series of water tubes connected to the boiler, which were placed between the furnace bottom and the flame.

The full report of these tests by Henry Kreisinger, research engineer, Combustion Engineering Corporation, and John Blizard, fuel engineer, U. S. Bureau of Mines, will be published later by the Bureau of Mines.

ASIA'S MACHINERY MARKET

Critical Survey of Possibilities of Increased American Business with the Far East

IN a 332-page book, Walter H. Rastall* makes a comprehensive survey of the possibilities of extending the sale of American machinery in that portion of the world extending from Japan and New Guinea on the East to the western borders of India. The survey was undertaken when it was found that American machinery exports, at the close of the war, were likely to fall below the totals attained during the war; and an effort was in order to replace lost markets by new ones and to stimulate sales in markets already partially cultivated. Some of the outstanding features taken up in the book, which has just been published, are covered in the following paragraphs.

American machinery exports have grown from \$51,500,000 in 1910 to \$383,600,000 in 1920, falling to \$246,400,000 in 1921. Prior to the great war about 7 per cent of our exports were absorbed by Asia (omitting Asia Minor). For the three calendar years, 1919, 1920 and 1921, however, the average reached about 22 per cent, or more than three times the previous proportion. The amount has increased from an annual average of less than \$5,000,000 in the three earliest years mentioned to an average of more than \$69,000,000 in the three most recent years. It is this market which is surveyed in this book, which gives the following

Reasons for Superiority of American Designs

"American machinery has been developed in a country where operations are conducted on a larger scale than elsewhere. The amount of machinery per workman is greater than abroad. In 1919 the capital invested per workman in the United States was \$2,350, as compared with only \$1,030 in the United Kingdom. In other words, when an American designer starts on a new machine, consciously or unconsciously, he plans to invest up to \$2,300 per workman, whereas the British designer limits himself to about \$1,000. Obviously, the American designer develops the better-planned unit. Also, this does not mean that the American machine is simply equipped with some additional convenience or labor-saving attachment, but this 130 per cent increased investment is worked into every detail of the American designs. By this we know a 'modern' from an old-style machine. Europe and Asia have not yet worked up their designs to these high standards.

"The claims of long life frequently made on behalf of European designs often represent underloading. The life of a well-made marine or factory engine is in excess of 20 years at full load and speed; the life of an equally good automobile engine probably would not exceed 90 days and that of a very good airplane engine not over 200 hours. But if the automobile is not worked it may easily 'run' 10 years. This claim of long life on behalf of European equipment is probably made in connection with locomotives as often as anywhere but, outside of the United States, where can one find locomotives handling trains of over 4000 tons net as a matter of daily routine? In an article by Sir Eric Geddes, Minister for Transport, as published in the *London Magazine* for March, 1921, is the following statement of the British position:

"In this country we actually get less goods traffic over each mile of running track per annum than was obtained in pre-war days in Prussia, Belgium, the United States and other countries. Our average net or paying trainload is 134 tons of freight; in the United States, in 1917, it was 533 tons; in Prussia, in pre-war days, it was 236 tons. To raise the trainload by 10 tons would mean a saving in haulage costs above £1,700,000 a year. To raise the average wagonload—which

is roughly 5½ tons in this country, 25 tons in America, and nearly 9 tons in Prussia in pre-war days—by ½ ton means a saving of nearly £5,000,000 per annum."

Reasons for Superiority of American Workmanship

Quantity production of interchangeable standardized parts is distinctly an American achievement and has had a most pronounced effect on a great deal of our machine design, especially such machine tools as have been used in the production of automobiles, aircraft, munitions, etc. The principles involved are reflected in the interchangeability of parts of practically all types of American machinery. There has been talk in England of copying our methods in this respect but, when it is realized that the total British automobile production has never exceeded 70,000 cars in any one year (about the number which the Ford Motor Co. turns out in two to three weeks), as compared with more than 2,000,000 in the United States, it is evident that our British cousins have a long distance to travel. Studies of the designs of the newer types of British machine tools caused *Engineering* (London) to say that "the British manufacturer has as yet touched little more than the fringe of mass production."

The European idea that accuracy can be secured only by hand fitting has had to give way to the American idea that interchangeability cannot be secured when hand fitting is permitted. American shops produce complicated parts economically and by standardized methods within the narrowest of tolerances. One American manufacturer produces gage blocks guaranteed to be accurate within 0.000025 part. Practically all machinery exported from America is of a design which has been thoroughly standardized to meet the severe requirements of the domestic market. All of it is required to show the utmost capacity, efficiency and dependability, to a degree not known abroad.

Divisions of the Asiatic Market

In his survey of the various fields, Mr. Rastall divides the market into (1) India, (2) Ceylon, (3) the Malay Peninsula, (4) the Dutch East Indies, (5) the Philippines, (6) China and (7) Japan. Each was analyzed as to its present status as a machinery using country, the possibilities for growth along lines particular to it and the special requirements which machinery for each individual market has to meet.

There has been a rapid growth in the sale of American machinery in the Dutch East Indies, the figure in 1910 having been less than \$85,000. In 1918 it was \$2,171,000 and in 1921 \$5,061,000. This has been at the expense of our competitors; thus in 1910 total American sales in that district were less than 6 per cent as much as those of Holland, while in 1919 our sales exceeded those of Holland by more than 50 per cent and stood second only to shipments from Singapore—much of it of British origin. Coffee, sugar, tin, rice and cocoanut oil are the principal products made in exportable quantity. Most of the coffee and tin are shipped out as raw materials. Sugar mill machinery, however, together with that for extracting oil from cocoanuts, has found a ready sale. The existing rice mills are small and operated mostly by Chinese. There should be a good opportunity to improve upon the methods of cleaning and processing rice, the annual crop of which is about 3,500,000 tons.

In the Philippines, with only 30 per cent of the population of Java, the machinery imports in 1918 were almost identically the same. Machinery is used for lumber and saw mills, tobacco manufacturing, cocoanut oil, rice and sugar mills, principally. In common with most of the Eastern countries, however, much of the manufacturing is of the home type, on a very small scale, rather than on the factory basis with consequent large use of machinery. As the population becomes more accustomed to American methods, we may expect to see a large increase in the demand for machinery.

With the great interior of China we have little to do. Along the seacoast, however, and up the principal rivers, there should be much larger use of ma-

*Late United States Trade Commissioner in the Orient, and now chief of the division of machinery, bureau of foreign commerce, Department of Commerce, Washington. The book is for sale at 60c. by the Superintendent of Documents, Government Printing Office, Washington.

chinery than in the past. China has an area greater than that of the United States and a population estimated at between three and four times ours. Textile machinery constitutes the largest single element of Chinese consumption. But machine tools, electrical machinery and machinery for handling vegetable oils, as well as flour mills, find a ready use in certain parts of the country. There are four cement plants and the railroad repair shops, both requiring a certain amount of machinery. It has long been regarded as certain that China will some day require large quantities of machinery, much of which will be supplied by the United States.

Conditions in Japan

Japan already is a large user of American machinery, the largest single item being spinning mills. Metal and wood-working machinery take second place while steam boilers and electrical machinery come third and fourth. So long as Japan continues to export to the United States the great bulk of her silk in the raw form, the machinery required for turning this material into manufactured silk will be made and used in the United States. If Japan, however, increases her own use of machinery and with it the proportion of silk manufactured before being shipped, a great demand for American looms and spinning machinery is bound to develop. The tremendous growth of Japan's foreign commerce will be appreciated from the statement that it was less than \$90,000,000 in 1893 and more than \$2,140,000,000 in 1920. The gain in 27 years was approximately 24-fold.

There is a certain amount of machinery manufactured in Japan, but the obstacles have been great, chiefly an inability to get steel and iron parts of satisfactory quality at a reasonable price. Imported materials are costly and the domestic article has

generally proved unsatisfactory. Japanese manufacture of machine tools has been of the imitative kind, based on the importation of a single unit which then was copied in its entirety. As the mere reproduction of sizes and shapes of machine parts, however, cannot produce the result obtained by a machine designed with full regard to the uses of those parts, the success of the Japanese machine-tool building industry has not been great. Quantities of machine tools continue to be imported, mainly from the United States, and this condition is likely to persist for many years.

Electrical machinery is being used to a larger and larger extent, some of it being made locally, but most of it imported from the United States. Paper and the vegetable oil industry are important in the aggregate in Japan, although the individual plants are small. Cotton spinning and shipbuilding have flourished recently, it having been the practice in the latter case for Japan to buy a ship from England or elsewhere and then reproduce it with native materials and labor in such numbers as were desired. In some of these cases propelling machinery has been purchased from the United States.

Cost of Making Sales in Asia

A warning note is sounded with regard to the expense of maintaining selling forces in the East. It is a far higher expense than is usually realized and much above what it would cost in the United States. As a single example, an American manufacturer's representative in Tokio resigned because he could not support his family—wife and two children—on \$10,000 per year. Numerous servants must be kept and much of what the salesman and his family wears and eats is imported, at high cost. Clubs are essential and expensive—so is education. Hence the cost should be counted before an office is established.

Carbonized Clay as a Refractory Material*

New British Product for Furnace Linings—Its Manufacture and Properties—Alkalis as By-Products

BY WALTER SMITH

THE employment of clay and carbon as a combination of materials for heat-resisting products does not appeal as anything new, since plumbago crucibles and carbon bricks are universally used.

These articles, however, consist of clay and carbon mixed together, or mechanically blended in proportions necessary to give a composite body for the purpose required.

In this paper my desire is to point out the marked difference which exists between admixtures of carbon and clay, and the structural change in clay itself after undergoing treatment by carbon-charged gases according to the process.

Contractive Force

It is well known that clays in general contract at the initial burning, and also that some clays contract more than others. This phenomenon in itself has been a source of difficulty to clay workers, because of the fracture which is liable to result in the clay substance. Ball-clay contracts to such an extent that it can hardly be used successfully unless mixed with other heat-resisting materials, to which it acts as a binder.

This contractive force in clays, like all similar molecular action, is enormous; the energy is governed by the peculiarities of the clay, and in ball-clay the phenomenon is exhibited possibly at its best. The first laws controlling the carbonization of clay are those relating to density as a result of compression.

A particle of the ground clay material is susceptible of varying degrees of porosity, both in the unburnt and

successive stages of the burnt condition. It reaches maximum porosity in the earlier period of firing, at a point when the clay is in the biscuit state. The material is then extremely absorbent.

This opportunity is seized for charging the clay with volatilized hydrocarbons, and the operation is carried out with the highest efficiency, owing to the extreme porosity of the clay substance and its affinity for the carbon-laden gases. Thus charged, the clay grain is presented in a biscuit condition, infused with atomic carbon to the highest degree.

Heating being continued, the contractive force of the clay is exerted, and this proceeds until contraction limit has been reached. Here are the myriads of particles of atomic carbon, compressed from the easy positions adapted by themselves by volatilization to a density which may be compared with that of steel, and the product is a carbonized clay grain.

Black carbonized clay consists of clay grains reinforced with countless infinitesimal particles of carbon diffused throughout the pores. These carbon particles are charged into the clay during the biscuit stage of firing, the material then reaching maximum porosity. As contraction of the clay increases on further heating, the myriads of carbon particles resist the forces at work, with the result that the compression exerted on each carbon particle produces the hardness of the ultimate carbonized clay grain. In other words, the carbon being inert and practically non-compressible, the irresistible contractive force operating in the clay substance can only expend itself in density, the clay acting like a uniform vice on each carbon particle offering impediment to the molecular pressure exerted in the mass, until the contraction limit has been

*From a paper delivered before the West of Scotland Iron and Steel Institute and published in its *Journal*.

reached. This produces the remarkable density of the ultimate carbonized clay grain, and so long as this material remains in a reducing atmosphere it resists the destructive action of heat beyond the highest commercially workable temperatures, and is unaffected by acids.

Carbonized Clay Grains

The clay grain thus treated is a very different proposition from one composed of clay merely mixed with carbon, no matter how impalpably each are ground for the purpose, and it is to this difference I now desire to draw attention.

It is well known that the divisibility of the clay particle is practically unlimited, and in their final stages of subdivision the particles are so fine that no microscope is capable of revealing them as separate bodies.

To the practical mind, some idea of this minutiae may be conveyed in the following statement by Mellor: "There is an enormous increase in the number of granules for a given mass of clay, as the particles are reduced. If the grains of a clay were all a millimeter in diameter there would be, in round numbers, 720 grains per gram, and if the grains were 0.0001 mm. in diameter the number would increase to the enormous total of 720,000,000,000,000 grains per gram."

Particles finer than the latter, however, are obtainable by what is known as the Osmosis process of clay purification by the electric current, wherein the latter figures would probably have to be multiplied several times to represent a mass of the same weight.

Advantage has been taken of these facts, and what may be inferred from them, in the evolution of the process which results in the carbonization of clays, and the practicability of manufacturing from such clays the important articles which fall under the headings of refractories, acid-resisting ware, and abrasives.

In former processes involving the use of clay and carbon the practice has been to mix these two substances together by mechanical means, in nearly all cases using carbon in the form of plumbago or powdered coke. It is evident that by no process of grinding can clay be reduced to the fineness and almost unthinkable minuteness of the particles described above, the grains obtainable by the finest and most costly grinding machinery being as boulders to grains of sand in comparison.

Obviously, therefore, when ground clay and carbon are mechanically mixed, the result in reality, and in effect under the microscope, is irregular lumps and blocks of clay more or less evenly distributed among the particles of carbon of varying sizes, depending whether coke or graphite is used.

The conclusion drawn is that by no form of mechanical mixing can a complete union of clay and carbon be obtained, such as is necessary to produce carbonized clay with the manifold qualities the material unfolds.

Returning to the clay particle, the finest particles obtained by the Osmosis process do not represent the greatest possible divisibility; the subdivision may be carried to an almost infinite degree before the colloidal state is reached. The most remote particles, however, are reached by permeation of the clay substance with carbon containing gas.

Thus there is a very distinct difference between the mixtures of carbon and clay, such as occur in the manufacture of carbon crucibles, and the saturation of clay substance by volatilized carbon gases.

Therein lies one of the leading factors in the carbonizing process. No matter how minute a particle of clay and a particle of carbon may be in proximity, the clay will remain clay and the carbon remain as such beside it, unless at temperatures difficult to attain except by the electric arc. For ordinary clay-working processes such temperatures are commercially impracticable.

The Carbonizing Operation

There are several methods of carbonizing clay, but expert knowledge is required in application of the process to different grades and qualities of the material.

The governing principles are heat and time; a correct determination of the quantity and duration of both

these factors is necessary for efficient carbonization of any particular clay.

Given a specific method of working, it is not to be inferred that the uninitiated worker can forthwith carbonize all clays. Successful carbonization depends on skill in the application of it to the selected clay to be carbonized, and in this paper, therefore, I am able to give only a general view of the *modus operandi* and its effects, assuming that a clay has been found which will stand the treatment, and that the requisite temperature and duration of firing have been determined.

The clay is susceptible to carbonization in lumps as it comes from the mines; each lump, by proper treatment, absorbs to its core the amount of carbon required. But there is objection to this method, because the finished material would resemble blocks of ironstone; it is so hard that the cost of pulverizing and wear and tear on machinery would be too great. It is, therefore, advisable to grind down the raw clay to the mesh required before carbonizing.

To effect carbonization, an ordinary muffle kiln is sufficient for general requirements. Within the muffle the coal and clay are so placed that on heating the volatiles given off will be absorbed by the clay until complete saturation occurs.

Dissociation of the gases takes place within the clay substance, residual carbon being retained. The spent gases are conveyed through vents in the muffle arch by suitable piping to a gas container. Arrangements can be made for conveying the gas to the kiln fireholes for consumption with the fuel used in firing.

After dissociation of the gases, the clay has received its carbon charge. Heating is continued until the grains are contracted to their limit, the temperature being determined by the nature of the clay under treatment.

Economy of Process

Attention may now be drawn to the fact that in a properly constructed plant there is no loss accruing by reason of the coal giving up its gases during the carbonizing period. The clay retains only such carbon as may be set free by distillation. The heating and lighting qualities of the gases are unaffected, though they have in transit fulfilled the object of carbonizing the clay. The gases which ascend from the muffle are, therefore, available for use.

The coal itself by the operation is, of course, converted into coke, and it is a question whether coke so obtained is not, in some respects, better than coke derived from some coking processes. In the experimental work fine silver coke was invariably produced.

Whether the retarding effect offered by the clay to escape of gases beneficially affects the coke formation remains to be seen; meantime we know that unusually good coke is delivered after the carbonizing operation.

Thus the coal gases carbonize the clay, after which they may be utilized; while the coke derived from the process forms a fuel for subsequent work.

Method of Binding

There are several methods of forming the material into bricks and other products. In a former paper on carbonized clay I referred to a system of binding the granular powder by means of pitch much in the same way as coal dust is made up into blocks by briquetting machinery.

If the granular material is fine enough and sufficient pressure is given by the briquetting press, the brick may be sent out for use without further treatment.

If a coarser material is used a second firing may be necessary in order to complete the bond; but a system has been devised whereby the second firing does not appreciably add to the manufacturing costs.

Contraction

It should be observed that the brick so made will not contract to any perceptible degree by subsequent firings. Contraction has been taken out of the clay particles by the carbonizing operation.

Bricks delivered from the press, and similar bricks fired in commission for months afterwards, should measure practically the same in every direction as the interior mold measurements from which they came.

Thus one of the greatest troubles in connection with refractory materials is overcome.

White Carbonized Clay and Abrasives

White carbonized clay results from the action of an oxidizing flame on black carbonized clay, and it should be noted that black carbonized clay is a material which has been already contracted to the limit by heat.

When an oxidizing flame plays on the black material, the myriads of particles of inclosed carbon are gradually consumed, while a corresponding number of minute pores are created.

Thus, instead of having the porosity which occurred naturally in the biscuit state of the clay (uncontracted), there exists an artificial (and almost equivalent) porosity in the fully-contracted material, and, since the contractive force of the clay has been expended, the artificially created pores remain constant.

In other words, when further heating is applied to the mass, the limit of contraction having been reached, difficulty is encountered by the heat in bringing about a state of fusion; the fusing point is, therefore, transferred several hundred degrees higher than that of the same clay in its natural state.

As a heat conductor, the clay should be used in the black condition; as a non-conductor, in the white.

The hardness of carbonized clay is just short of carborundum; indeed, it might replace the softer grades of carborundum. It is amorphous instead of crystalline; the production of a tough form of grinding wheels, files, sharpening slabs, etc., is therefore practicable.

Heat Conductivity and Slag Penetration

A table of conductivities by scientific test is given below:

Firebrick	Carbonized Brick	Graphite	Carborundum
1	2	4-5	4-6

Thus the carbonized brick conducted heat with twice the efficiency of the standard firebrick.

The following is from a report: "The resistance of the brick against slagging due to iron scale and ordinary furnace slag was tried against a standard firebrick. The carbonized brick was found to be much the better. It was very loth to slag, and when slagging commenced it was the surface only that suffered, no slag penetration of any size being noted."

Alkalies as By-Products

A further effect on clay by carbonization is liberation of the alkalies. A bottle was shown containing a mixture of potash, soda, and some lime, the salts being mainly soda. The quantity, about half a teaspoonful in bulk, had been extracted from a fragment of Oxford clay building brick about the size of the piece of clay from which the iron oxide was taken.

The possibility of extracting alkalies from clay, while enhancing the qualities of the clay by the process, is therefore shown.

Carbonized Clay Powder

If no brick or other article were ever to be made from carbonized clay, a vast field of work lies waiting in employment of the powdered material alone for lining and repairing furnaces, protecting the outside walls of gas retorts from direct action of heat, embedding floors and hearts of steel furnaces, and lining and repairing blast muffles for research work. An important feature lies in this application of the powder.

When a hole or crack in a furnace is repaired by carbonized clay, the effect is identical with that of cement.

Summary

To put the matter briefly, the introduction of carbonaceous material is made with the object of charging clay with fine carbon as nearly as possible to a point of complete saturation. Less carbon content may exist, but the element in smaller quantities would in some instances be detrimental, tending to reduce the melting point of the clay; also the methods of firing are adopted with the object of charging clay with carbon while the clay is in a state of maximum porosity, and of retaining the full charge of carbon by means of contraction of the mass.

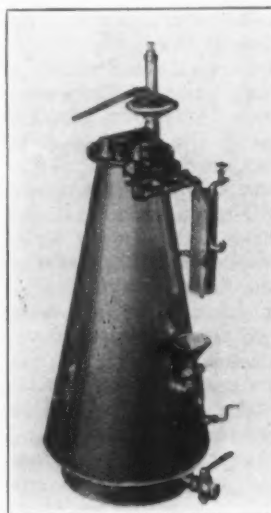
The above shows the impracticability of any ha-

zard methods, and lays down a definite means to a definite end in the working of the process.

So far as I have been able to find, the action on clays as a result of carbonization is mainly physical; but before it can be stated that there is no appreciable chemical change, an explanation must be given of the tremendous upheaval evidenced in the clay substance by the liberation of iron oxide and alkalies in such quantities that the possibility lies before us of working these compounds as by-products in a system making practicable the purification of clays on a commercial scale.

Portable Acetylene Welding Generator

A new portable acetylene welding generator, intended to obviate the use of high pressure cylinders, has been added to the line of the Alexander Milburn Co., Baltimore.



The generator is of 30-lb. carbide capacity, or equivalent of 150 cu. ft. It has comparatively few parts and operates automatically without clock or motors. The steel body is welded throughout, and the component parts are arranged for accessibility. The weight of the device illustrated is 200 lb. The diameter at the bottom is 24 in. and at the top 12 in. The height is 5 ft. 3 in. overall.

The new generator is intended to provide a convenient and comparatively inexpensive source of acetylene gas.

New Low Phosphorus Sinter

A new low phosphorus sinter suitable for making low phosphorus pig iron is listed in the 1923 iron ore analysis book issued by Clement K. Quinn & Co., Duluth and Cleveland. This is a sintered magnetite ore from the Mesabi range and runs 67.50 per cent in ore and 0.012 per cent in phosphorus. Heretofore, this firm has offered only Mesabi sinter running 64 per cent in iron and 0.027 per cent in phosphorus. Quinn & Co. have also issued a pamphlet on manganiferous iron ores, giving results attained last year in their manganiferous ore treatment plant at their Mahanomen mine on the Cuyuna range, where all their manganiferous ores are treated. They state that results have been universally satisfactory. Not only is the distribution of the manganese regular and uniform, but in reducing the moisture it has been possible to increase the combined iron and manganese metallic content, by 3.5 points, making this 48 per cent in all grades. Other advantages from the furnace standpoint, it is stated, have also been obtained. Being crushed and screened, the ore is of uniform size and contains no fines or large lumps. As no heat is used in the process, there is no dust or danger of leakage from cars in transit. The product resembles beach gravel in structure.

Standardized Engineering Symbols

Under the auspices of the American Engineering Standards Committee a definite movement is on foot to standardize abbreviations and symbols employed in engineering, scientific and other technical fields. It is believed that such a result would do away with much of the present confusion, misunderstanding and frequent errors due to the present heterogeneous condition of the literature of the subject. The standardizing effort now being put forth is to be extended also into graphical symbols used in engineering drawings and diagrams.

Foundry and Furnace Coke Compared*

Finishing Temperatures in the Ovens Affect the Quality— An Ideal Foundry Fuel Possible—Specifications and a Simple Test

AT a recent convention of the German Foundrymen's Association, Dr. H. Koppers, of Essen, delivered an address on foundry versus furnace coke which has been published by *Die Giesserei*. A serious lack of knowledge on the subject exists in both foundry and furnace procedure, and Doctor Koppers gives the summary of his long experience and his observations on the matter at issue.

Coke is the residue from the distillation of coking coals; charcoal, similarly, of wood. In both cases there results an enrichment in carbon. Unfortunately the carbon in our fuels is not pure but is associated with more or less volatile matter, in addition to ash and moisture. What is of particular interest is the heat value, as also the relation of the fuel to the carbon dioxide produced. The constitution of a fuel can be expressed by the proportionality of the carbon contained to the volatile constituents—the oxygen and hydrogen in particular.

If a diagram were constructed giving the temperature range horizontally, and the separate hydrogen and oxygen percentages of the gases vertically, it would be found that for the range in temperatures corresponding to charcoal making, or 650 to 1100 deg. Fahr., the oxygen percentages drop from 13.5 to 6.1, and the hydrogen percentages from 4.2 to 2.6. For the range in temperature corresponding to coke making for blast furnace purposes, or 1200 to 1475 deg. Fahr., the oxygen percentages drop from 4.0 to 1.9, and the hydrogen percentages from 2.2 to 1.3. Finally, for the range in temperatures corresponding to coke making for foundry melting purposes, or 1825 to 2000 deg. Fahr., the oxygen percentages drop from 0.8 to 0.3, and the hydrogen percentages from 0.5 to 0.2. At this final coking temperature of 2000 deg. Fahr., the volatile matter of the coal is practically all gone.

In the process of coal distillation the tarry matter begins to volatilize at about 925 deg. Fahr. The coke residue then begins to harden and contract, and as the temperature rises the gases coming off become constantly richer in hydrogen, carrying with it small quantities of methane and carbon monoxide. As the temperature rises still further the coke becomes denser, so much so that a determination of the true specific gravity of the coke will give an indication of the temperature attained in the process.

Effect of End Temperatures in Coking

The higher the end temperature of coking, the higher the ignition temperature of the coke made. Also the lower the rate of combustion, this rate being understood to mean the time it takes for the carbon dioxide of primary combustion to dissolve more carbon to make carbon monoxide. Now, the allowable time for this change from carbon dioxide to monoxide is extremely small in both furnace and cupola. In fact, in the furnace it is too fast to measure at all. In the cupola, however, it is essential that this reaction be interrupted as quickly as possible so as to get the maximum heat effect of the fuel used. The maximum rapidity of the above mentioned conversion for the blast furnace and the prevention of the conversion to the best extent possible, then, are the basic requirements of the two respective processes.

As previously indicated, it is desirable to produce easily combustible furnace coke at low coking temperatures, by interrupting the process when a sufficient degree of hardness has been attained, or from 1200 deg. Fahr. upwards. Such a coke will serve its purpose well. For the cupola, however, a much higher coking tem-

perature is obligatory, to drive off practically all the volatile matter and to increase the true specific gravity to the degree of maximum density, which will mean the greatest retardation in the conversion of carbon dioxide to carbon monoxide.

A diagram constructed from the results of a specially slow conducted coking operation, showed that with a volatile percentage (by volume) of 10.5 of the coke when at 925 deg. Fahr., this volatile was reduced to 1.2 per cent by the time 1475 deg. Fahr. had been reached. Again, with a true specific gravity of 1.38 at 925 deg. Fahr. as above, this rose up to 1.77 when 1475 deg. Fahr. was reached.

Law of Bourdouard's Equilibrium

It is customary to apply the law of Bourdouard's equilibrium when studying the combustion of a fuel. This equilibrium presupposes a fixed relation between carbon dioxide and monoxide for every temperature in the presence of additional free carbon. It is supposed to be correct, however, only when the carbon dioxide may react upon the free carbon present at the fixed temperature for a sufficiently long time to create the equilibrium. Under such conditions the law holds for charcoal, coke and even graphite, which certainly is difficult to burn.

In the blast furnace, as also in the cupola, these time conditions do not prevail, hence the application of the law in question is not permissible. Indeed, when tried, the variations from the law will be found very wide. It is practically a question of time for the reaction. In the furnace this should be so short that the zone of oxidation may be as limited as possible about the tuyeres. In the cupola, the slower the reaction the better the utilization of the heat units of the fuel. Not more than 3 to 5 per cent of carbon monoxide should be formed as the gases pass through the melting zone.

As coke is made today, it is a mixture of a number of varieties—from readily combustible to the opposite. It becomes almost impossible to differentiate between furnace and foundry cokes. The consequence is injurious to both operations. In the blast furnace there will be a reduction of tonnage, too much coke will be used, the iron will be inferior in quality, and excessive power and gas will be used, meaning high operating costs. In the foundry the injury will consist of getting inferior pig irons, using more coke for melting than should be necessary, dull and inferior iron, high sulphur, lost and hard work, meaning also high production costs.

What Is Inferior Pig Iron

In this connection a word on what constitutes inferior pig irons. The analysis of a pig iron by no means gives all the information there is about it, for pig irons of the same analysis may show widely differing physical properties. Recent investigations have shown that with the usual carbon, manganese and other elements, there is practically always present in iron and steel some ferrous oxide. This explains why a pig iron made in neutral atmosphere in the blast furnace contains much less oxygen than where a coke that is combustible with difficulty has been used. In the latter case, moreover, the sulphur will be high also. The foundryman is just as desirous to know that the furnaceman uses easily combustible coke as he himself wants the other kind.

Attention has been called to the radically different requirements of coke for furnace and foundry use, yet the specifications governing the sale of this fuel do not take them into account as they should. Ordinarily, only moisture, ash and sulphur, with porosity and crushing strength are looked after, and the literature

*Abstracted and commented on by Dr. Richard Moldenke, Watchung, N. J.

on the subject is very unsatisfactory. A large series of tests was made some time ago with cokes of the Ruhr district, by igniting both furnace and foundry varieties in a current of carbon dioxide. Furnace coke was reduced 5.07 per cent in weight, and foundry coke 4.46 per cent—in averages. This was a slight advantage for the foundry product, but as to analysis, strength, porosity and calorific value, they were about the same. This shows that more light is needed on the subject.

Coke in the Ruhr District

Many years ago the Ruhr district did make distinctly good foundry coke, by continuing the heating of the ovens after the coke was done, thus superheating it before drawing. This, however, was the time of the bee-hive oven. Thus, long before the advent of the by-product oven, the industry had differentiated between the two classes of coke through actual experience. Unquestionably the superiority of 72 hr. coke for foundry purposes is due to the high temperatures prevailing in the oven at the end of the longer run.

The history of the by-product oven shows how little regard was paid to the condition of the coke resulting. This was considered a residue that required no special thought except to sell it. Even that type of oven was preferred in which the combustion of the heating gas took place at the bottom, thus coking the coal charged from the bottom of the oven upward. The coke might be ready at the bottom 12 hr. before the top coal was converted. Such coke, when the oven was drawn contained all kinds of structures, and was good for neither furnace nor foundry, so far as economical operation was concerned.

If a series of small shaft furnaces, of the same dimensions and supplied with the same blast conditions, be set side by side and charged with the same sized pieces and weight of fuel, if this fuel consists respectively of charcoal for the first, then sets of coke made under different temperature conditions, from lowest to highest, then if the fuel is lit and the blast turned on, the nature and extent of the flame above the furnace can be studied. It will be quite high above the charcoal, or easiest fuel to burn, smaller as the fuels become less combustible and very short for the coke made at highest oven temperature. In the case of charcoal the change from carbon dioxide to carbon monoxide is so extremely rapid that a great flame of burning carbon monoxide will be present above the shaft furnace even when starting up with cold blast.

Coke for blast furnace use, that is, drawn from the oven when sufficient strength has developed, and still at comparatively low temperatures, will have a medium high flame, some of the gas conversion already taking place while blowing up the fire. If the blast be heated, the action will at once change and a flame more like that from charcoal eventuates, showing that with hot blast the conversion from carbon dioxide to carbon monoxide is hastened very materially. When, however, strictly foundry coke is blown, the carbon dioxide formed in primary combustion is not converted to carbon monoxide readily, and the flame is quite low.

The importance of having such a retardation in the gas conversion for cupola melting purposes will be better seen when the following figures are considered. One pound of carbon burned to carbon dioxide yields 14,544 B.t.u. applicable for melting the metal charge put on the bed. If this pound of carbon, converted by primary combustion to carbon dioxide, has the carbon dioxide converted to carbon monoxide before reaching the metal charge, there will be available for melting purposes only 4450 B.t.u., or less than one-third of the heat value. To obtain coke desirable for foundry purposes the coal selected must be superheated very highly after coke has formed, so that almost the last of the volatile matter is driven off. Such coke will contract heavily and be prone to break up into small pieces. This, however, will not do, as foundry coke should come in large lumps and be able to stand transportation easily. So the only recourse is to be very careful in the selection of the coals used, and to lean toward the low-volatile varieties.

Specifications for Furnace and Foundry Coke

In view of the desirability of definite specifications

to cover the two distinctive varieties of coke, Doctor Koppers recommends the following:

	Furnace Coke	Foundry Coke
Moisture, per cent.....	3.00 Max.	3.00 Max.
Volatile matter, per cent.....	3.00 Max.	.....
Ash, per cent.....	9.00 Max.	9.00 Max.
Sulphur, per cent.....	1.25 Max.	1.25 Max.
Breeze at point of destination, per cent.....	6.00 Max.	6.00 Max.
Porosity (cell space), per cent..	50	40
Crushing strength, lb. per sq. in.	1,425	1,425
Size of pieces, any side, inches	Not over 4 3/4 in.	3 1/4 in. to 4 3/4 in.
Temperature of production, deg. Fahr.	1,200 to 1,475	1,825 and over
Coke pieces, reheated slowly, should not begin to give off gases again until, deg. Fahr.	1,475	1,825
Shatter test, for both kinds of coke: 110 lb. coke, in pieces from 2 in. to 4 3/4 in., after dropping 5 ft. 9 in. four times, should not show more than 25 per cent in pieces passing through a 2-in. screen.		
Rumbling test, for both kinds of coke: Same quantity and size of pieces as above, when put into drum 3 ft. 2 in. in diameter and 1 ft. 7 in. long, run 4 min. at 25 r.p.m., should leave 80 per cent of pieces on screen 1.6-in. mesh.		
Coals for foundry coke should be low in oxygen (low vola- tile), but of good coking quality.		

The shatter and rumbling tests for coke have been sufficiently described in the *Transactions* of the A. S. T. M., and the technical press. A method of testing coke as received at a plant which would determine at what temperature it was produced, however, is not generally known, and will be of interest. The method is based upon the fact, proven by many tests, that if a sample of coke is heated slowly, under exclusion of air, when the original temperature at which it was made is reached, evolution of gas will take place, hydrogen and carbon monoxide being given off in unmistakable quantity.

Ten grams of the coke, pulverized to go through a 20-mesh screen, are put into the porcelain tube of an electric furnace. The tube must be previously exhausted of its air and be filled with hydrogen. A thermocouple is inserted at one end and into the sample, and the sample raised in temperature at the rate of 1 deg. C. per minute. The gases evolved are caught in a graduated tube, under water, the usual way. There will be no gas evolution of any account until the original oven temperature of the coke has been reached. When this is the case, however, copious gas begins to come off and can be measured. From the temperatures thus determined a coke can be judged for its availability or not, for furnace or cupola.

Doctor Koppers gives some illustrations showing how this test was devised. The samples of coke were selected from predetermined points in the oven, the temperatures being known. On reheating slowly in the laboratory furnace, as above, gas began to come off when the original temperatures were reached, and not before. He then discusses some recent cupola developments in which heat regeneration is used. This, he claims, is not at all necessary if the coke is made right in the first place; for if the coke were produced at the high temperatures he gives, it would be necessary to only charge one pound of coke to 12 lb. of metal (between charges) instead of 1 to 10 as now practised under the best of conditions.

Doctor Koppers also asks that coke be used dry, for if the individual cells of coke have absorbed water, this turns to steam too fast to get out in time, as the coke descends into the melting zone, and the cells explode, to the detriment of good melting.

The subjects of oxidation of silicon and manganese in melting, and the enrichment of sulphur are next taken up and discussed. Doctor Koppers makes a unique suggestion to overcome these by charging basic slag in sufficient quantity in the early stages to accumulate a layer of 16 in. below the tuyeres, through which the drops of molten iron have to pass. This layer is kept uniform by drawing off additions during the run through the slag-hole in the usual manner. The iron is siphoned off through a peculiar spout construction, and in a general way the conditions of the crucible

of the blast furnace are reproduced. This idea of using a heavy basic slag layer to desulphurize and deoxidize is a new one in cupola practice, and would seem somewhat complicated to the average foundryman.

Different Temperature Production Methods Advocated

Doctor Koppers concludes with renewal of emphasis upon the requirement of different temperature production methods for the two classes of coke, and asks that this matter be taken up, seriously in order to get the best economy in fuel in each industry. In view of the work now being done along the line of coke specifications, the views presented by Doctor Koppers are very timely and important. Foundrymen are daily wasting fuel in enormous tonnage because of the inability to stop the gas conversion in their cupolas. Instead of having the gases at the charging door catch fire only toward the end of a heat, in most cases, even with excellent charging methods, the blast is hardly on half an hour when the flame appears—showing heat lost for melting purposes. The worst case, probably, is that of the sash-weight foundry where tin cans are melted. One pound of coke to three of tin cans is the usual ratio, and the flames sweep out of the cupola top 10 ft. or more in height when melting has progressed a while.

In the discussion that followed the delivery of the

address above reviewed, there was a considerable difference of opinion expressed. The producers of coke objected to much that had been said, and the foundrymen were in doubt about the proposed efficacy of the suggested thick slag layer. Doctor Koppers explained more in detail, stating that in this thick layer of slag there would be present a lot of incandescent coke, and the carbon of this would reduce any oxide of iron coming in contact with it.

Naturally, the makers of coke present held that the structure of the coke was more important than the temperature at which it was made, but it seems to the reviewer that the ideas of Doctor Koppers are well worth following out, for merely the height of the flame as shown by the tests with charcoal, high and low volatile matter cokes described in the tests with small shaft furnaces, would indicate that these fuels would be of widely different value when used in cupola melting. The foundryman is certainly desirous of obtaining, and entitled to getting that one class of coke which gives him the least conversion of the carbon dioxide to carbon monoxide, consistent with fast enough melting to be considered the most economical fuel he can use. The idea of a flame test with a small furnace, under standard conditions, looks mighty appealing to the foundryman who wishes to know what he can expect of a coke brand under consideration.

ST. LOUIS AS STEEL CENTER

President Maguire Tells of Great Importance of Carbonizing Illinois Coal

W. G. Maguire, president St. Louis Coke & Chemical Co., St. Louis, delivered an address on March 6 before the St. Louis members of the Investment Bankers' Association on "St. Louis as a Steel Center." He said that success of any company manufacturing iron and steel products is based upon two factors: Cost of assembling materials and favorable market for finished product. He traced the history of the growth of the Pittsburgh district, and then spoke of the Chicago district. He said that the first plant of any magnitude in the Chicago district was established at Joliet in the 70's. The next plant was the South Works of the Illinois Steel Co. Both of these plants in the 80's and 90's were undersold from time to time even in the Chicago district by the Pittsburgh manufacturers. The reason was the lower cost of coal at Pittsburgh. Chicago had no adjacent coking or gas coal and had to ship it from western Pennsylvania and pay transportation charges for the long haul to Chicago. Pittsburgh had it at its back door. Continuing, Mr. Maguire said in part:

"Had the early Chicago producers of steel been able to utilize Indiana-Illinois coal for coking and gas producing, the development of the steel industry in the Pittsburgh district in the 80's and 90's might have been a very different story.

"Approximately 20 per cent of all the coal mined in the United States is mined within a 125-mile radius of St. Louis. The establishment in the St. Louis district within the last two years of the plant of the St. Louis Coke & Chemical Co., with its present carbonizing capacity of 2500 tons of coal daily has advanced the line of pig iron manufacture from the shores of the Great Lakes 300 miles into the Southwest. For the first time in the history of this district, full advantage is being taken of its strategic position. The location of our plant at Granite City, just across the river from St. Louis, commands the same favorable freight rates and service as the City of St. Louis.

Assembling Raw Materials

"Our assembly of raw materials at Granite City, due solely to our ability to coke Illinois coal, is approximately the same as that of the Pittsburgh district, and we are approximately 300 miles nearer to the average Central Western market. St. Louis is practically in the center of a market of 100,000,000 people. In its immediate territory alone, over 20,000,000 people dwell

With the development of river traffic St. Louis is the only inland industrial metropolis that can reach an ocean port so cheaply and directly. Due to our ability to carbonize Illinois coal, steel manufactured here can be laid down at a parity of costs with steel manufactured in the Pittsburgh district as far east as an imaginary line drawn midway between Dayton and Columbus, Ohio. I leave it to your imagination as to our competitive ability in the States of Indiana, Illinois, southern Wisconsin, southern Minnesota, and all points west.

St. Louis Coke & Chemical Co.'s Products

"To tell you something about ourselves, as we are at the moment, we are the largest consumer and producer of freight in this district. We handle approximately 750,000 tons of coal, 365,000 tons of iron ore, 90,000 tons of limestone, annually. In other words, our inbound tonnage is around 1,250,000 tons. We produce for outside consumption 345,000 tons of coke, 185,000 tons of pig iron, 9000 tons of sulphate of ammonia, 6,000,000 gallons of tar, 2,250,000 gallons of motor spirit, and 3,000,000,000 cu. ft. of gas annually. During the year 1922 82.6 per cent of our surplus coke was marketed outside of the St. Louis district proper. The great majority of it in the Chicago district. Of our pig iron, other than hot metal consumed by the Granite City Steel Works, 40 per cent was shipped out of the St. Louis district, 41.4 per cent was shipped to customers on the east side, 18.6 per cent to St. Louis proper. Our hot metal is used by the Granite City steel works of the National Enameling & Stamping Co.

"The growth of the Granite City Steel Works has been primarily due to the foresight and vision of a real pioneer—a man who has more than put St. Louis on the steel map. That man is George W. Niedringhaus. I am not forgetful of Mr. Howard and Mr. Scullin, but their efforts have been devoted principally to the development of the steel casting industry, this district being the center of the indirect steel casting industry in this country, approximately 50 per cent of all indirect open-hearth steel castings in the United States are made here.

"As to the future of steel in this district—this is dependent upon the human equation—St. Louis can set about in confidence to manufacture and sell, the only limitations being the individual efforts of her citizens. Certain articles of industry and commerce, supplying certain demands of human consumption, have developed St. Louis into a leading position, but St. Louis has only commenced to grow in comparison with the territory that she could serve with manufactured steel products."

Magnetic Separation of Coal From Slag

New Patent Process Recovers 80 Per Cent of the Fuel From Slag and Ashes and Yields a Fuel With 75 Per Cent of the Original Heating Value

BY F. A. BRACKMANN

ABNORMAL conditions prevailing in Germany during the last few years have afforded a strong stimulus to the movement to increase the efficiency of industrial plants by saving fuel. Various inventions have been brought onto the market to reduce losses of steam in working and to increase the efficiency of machinery.

Increased interest has been taken also in different systems for the extraction of the remaining combustible matters out of ashes, and similar residues. The

by means of a new patent process which subjects the residues to the action of highly concentrated magnetic fields. The advantages of this process have been realized quickly, and a great number of plants are already working. Small coal, which is often contained in considerable quantity in the ashes, can be recovered also. This constitutes one of the main advantages of the magnetic system, and adds considerably to the economies effected.

Different trials and the results of separation plants

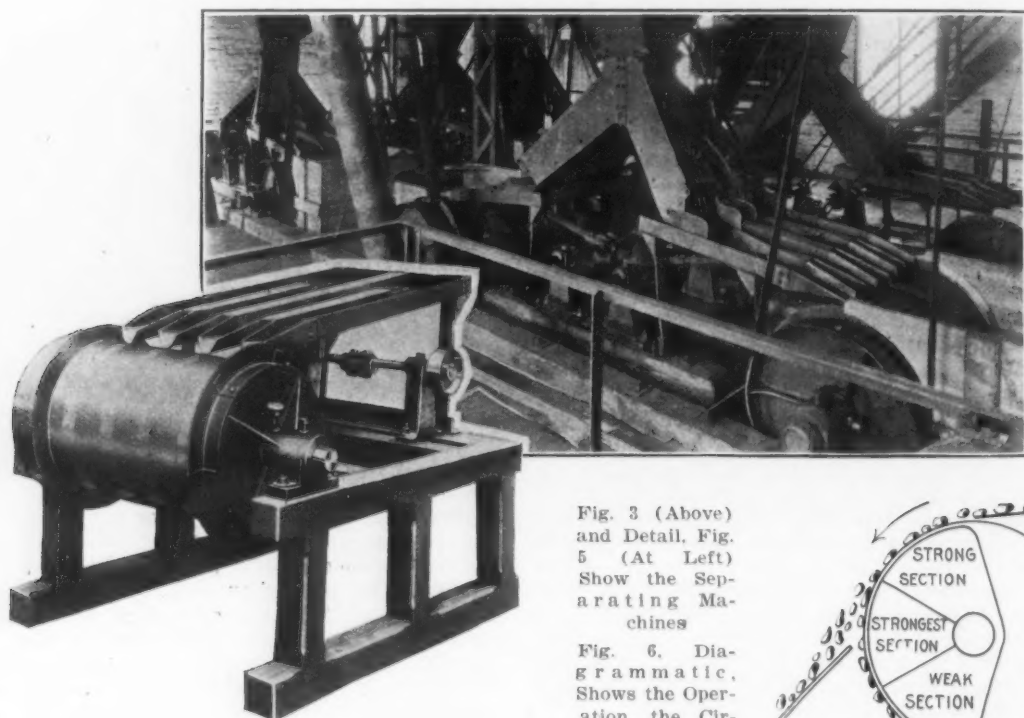


Fig. 3 (Above) and Detail, Fig. 5 (At Left) Show the Separating Machines

Fig. 6, Diagrammatic, Shows the Operation, the Circumference Being Divided into Sections Unequally Magnetized

wet, floating system of separation was first introduced, and various types have been placed on the market. They work on the principle that coke and slag have different specific gravities, varying according to the quality of the fuel, and to the degree of combustion. Sometimes there is hardly any difference in the gravity of slag and coke, and much of the latter sinks with the slag, which causes considerable loss of fuel. Unburned coal also sinks and is removed with the slag. This not only constitutes a loss of fuel but, as the slag is extensively used now in the manufacture of cement bricks, and as any coal mixed with it disintegrates after a time, the coal is thus detrimental to the quality of the bricks.

Working with water necessitates tempered rooms in winter, and other fluids used require constant observation of their gravity, and some make it necessary to clean the product again afterward. These deficiencies of the wet process have considerably assisted the introduction of a dry-magnetic system of separation.

This system, embodied in the patented plants put on the market by the Krupp-Gruson works lately, makes use of the fact that the iron pyrites in the coal change into ferric oxide during combustion. The magnetic properties of these oxides, which are bound to the silicates and the lime in the slag, make it possible to separate the latter from the combustible matters

at work have shown that more than 80 per cent of the combustible matter mixed with the slag may be recovered. The burning of the extracted fuel gives an efficiency from 70 to 80 per cent of that of the original coal. Naturally, the amount of the coal and coke contained in the residues varies with the quality of the coal and with the system of the furnace. To save transport cost, smaller plants should be as close as possible to the place where the slag and ashes become available. The plants are therefore built in two types, movable and stationary, and in different sizes, with a working capacity of from $\frac{1}{4}$ ton to 20 tons of residues per hour.

They consist of comparatively few parts. The residues are first tipped upon a grate of certain mesh, Fig. 1. Pieces too large to fall through are broken up with a hammer or run through a crusher. From the grate they pass through a sifting drum, Fig. 2, which separates them into two sizes. They are then passed to the separating machine, Fig. 3, where the slag on the one side and coal and coke on the other side, fall into separate channels which may lead

straight into cars or wagons below. Fig. 4 shows a movable plant of the type used on the railroad, with a working capacity of 2 tons per hr.

The separating machine (Fig. 5) is, of course, the principal part of every unit. This machine consists mainly of a shaking feeder and a magnetic drum. Smaller plants are sometimes provided with an elevator to haul up the residues, and the grate and the sifting drum are replaced by a sieve which is fitted to the shaking feeder to separate the two sizes. Very large pieces are cast onto a moving band on the side, where they may be sorted by hand. The feeder delivers the residues onto the drum, Fig. 6, and the coal and coke, being non-magnetic, are thrown off, while the slag is held to it by the action of the magnet, until it is carried past an iron baffle sheet, which keeps the fuel and the slag apart after separation.

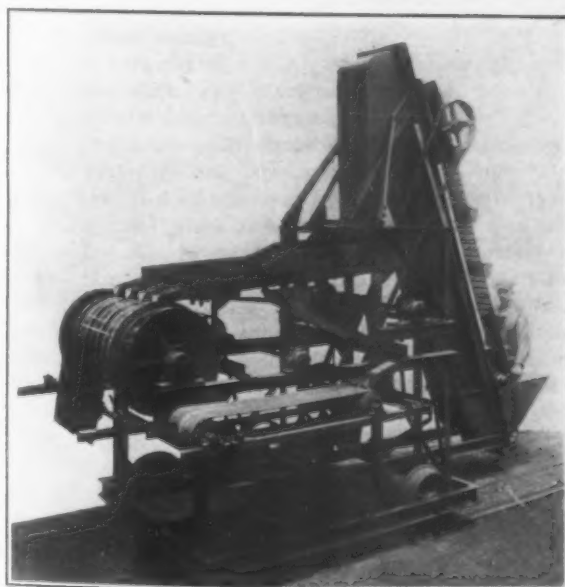
The magnet, which is stationary inside the revolving drum, consists of one, two or four fields, according to the size of the machine. Corresponding to the number of fields the feeder has two or four narrow channels leading onto the drum. Each field is divided into three sections: a strong one on the upper side, the strongest in the middle to counteract the centrifugal force and a weaker section below which carries the slag to the lowest part of the drum, where it falls off. A drum



Fig. 1—The Residues, Dropped Upon the Grating (Upper View) by the Clam-Shell Bucket, Pass Down to the Sifting Drum

Fig. 2—In the Sifting Drum (Center View) the Pieces Are Separated into Two Sizes and then Passed to the Separating Machine Shown in Figs. 3 and 5

Fig. 4—(Below) Portable Separating Machine with Elevator and Feeder



of two fields separates about 1 ton per hr., and needs about 1 kw. of continuous (direct) current. The machines are generally built for a voltage of 110 or 220. A small separating plant working up 1 to 1.25 tons per hr. requires about 1.5 hp., a plant of 2 to 2.5 tons about 2 hp., for the driving of the shaking feeder, the elevator and the revolving drum.

The process promises to be an important factor in the efficiency of railroads and industrial plants in the

future. Machines built on the same principles are also being used advantageously in the separation of slightly magnetic ore, as siderite, tungsten, limonite, red hematite, manganese, etc.

New Fire Cement on the Market

A new fire cement, developed by the Harbison-Walker Refractories Co., Pittsburgh, has been named "Thermolith." It is claimed for the new product that it sets hard and bonds fireclay brick firmly without heat and that it does not flux the brick at any working temperature. The new product is put out in dry powdered form and is applied with a trowel after mixture with water. It comes packed in 200 lb. airtight metal drums. Its producers recommend it for use in laying fireclay brick in blast furnace and blast furnace stove linings; boiler setting and firebox arches; heating forge and welding furnaces; copper, lead and zinc furnaces; cement, lime and pottery kilns; gas regenerator linings; brass furnaces and other miscellaneous uses.

Increased operations at the Steelton, Pa., plant of the Bethlehem Steel Co., effective early in April, have been announced. No. 4 blast furnace will be put in operation at that time, while work is being rushed on furnace E, with a view of blowing it in as soon as the repairs are completed. Three of the other four blast furnaces of the plant are now in operation. The 40 idle coke ovens of the plant will be started about the same time. When these are in operation, the entire coke oven department of 180 ovens will be active.

Moderate Earnings of Steel Corporation

Not Commensurate with Investment, Says Chairman Gary in
Annual Report—General Increase in Production
—Rails an Exception

THE twenty-first annual report of the United States Steel Corporation is for the year ended Dec. 31, 1922, and it reflects the improvement which took place in the latter part of the year. In earnings and in nearly every line of production, there were increases, but in the amount paid to employees there was a decrease of about \$10,000. Due to the decreases in wages which took place in 1921, bringing the rate down to \$3 for common labor, the amount paid to employees was considerably below that in the preceding year, until the wage increase of 20 per cent became effective Sept. 1,

which took place in selling prices during the year. Consequently the earnings for the year as shown by this report were relatively small for the volume of operations conducted and were not commensurate with the investment employed. At the close of 1922, the tonnage of unfilled orders of the subsidiary companies for the various classes of steel products was 6,745,703 tons in comparison with 4,268,414 tons at the close of the preceding year. Up to the date of the writing of this report, the new business booked in 1923 has exceeded the rated maximum capacity of the subsidiary companies. There has also been some improvement in the selling prices secured."

The statistics of production show some noteworthy increases in 1922 over 1921, as, for example, beehive coke manufactured, 102.1 per cent; Bessemer ingots, 37.9 per cent; open-hearth ingots, 49.9 per cent; structural shapes, 113 per cent; merchant bars, 118.2 per cent; axles, 327.2 per cent; steel car wheels, 122.9 per cent. Despite the coal miners' strike, the decrease in coal mined for steam, gas and other purposes other than the manufacture of coke was only 8 per cent, while in coal mined for the manufacture of coke there was an increase of 15.3 per cent. In the manufacture of steel rails there was a decrease of 17.2 per cent.

Improvements

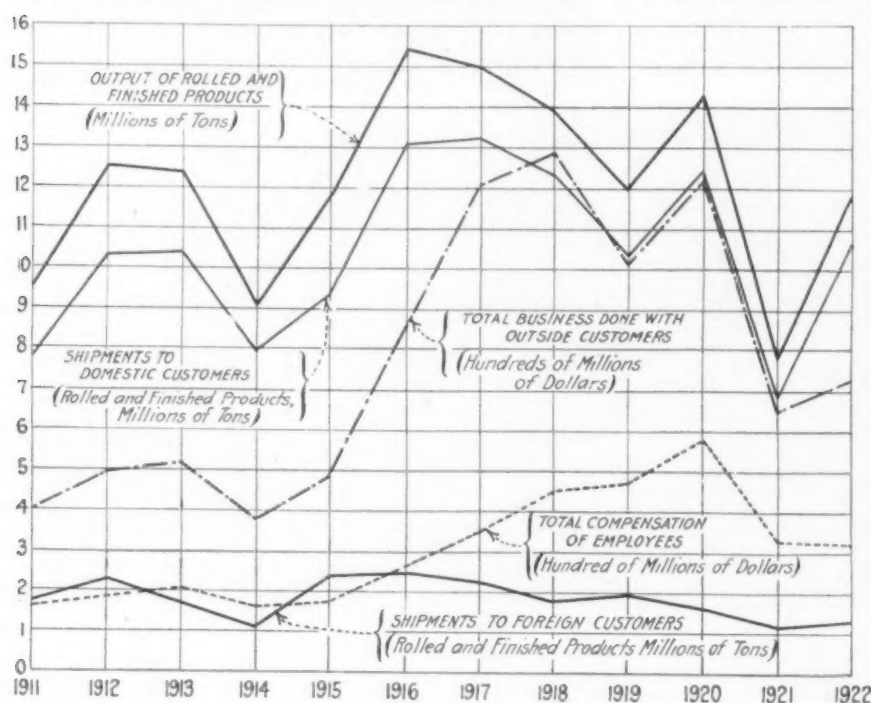
In the latter part of 1922 a program was authorized covering construction and improvement involving the expenditure of a

large sum. The additions and improvements included cover to some extent new capacity both for the production and finishing of steel, but more particularly the reconstruction with modern type of old and obsolete mills and facilities, including the building of by-product coke ovens to substitute for beehive ovens, the introduction of improved and more economically operated equipment, and the development of the reserve natural resources of the Corporation, especially of coal. At the close of the year, together with some important authorizations made shortly after Jan. 1, 1923, the unexpended balance on appropriations was about \$93,000,000. It is expected that approximately \$65,000,000 of this will be expended in 1923.

Volume of Business

The prices received in 1922 for the total tonnage of rolled and other finished steel products shipped, netted in respect to domestic shipments \$13.52 per ton less than the average price received per ton for an equivalent tonnage of similar products respectively shipped in 1921; and in respect to export shipments there was received \$19.70 per ton less than the average price obtained in the preceding year.

The total value of business transacted by all com-



Twelve Years' Course of Five Significant Features in the History of the Steel Corporation's Business

1922. The average earnings per employee per day in December, 1922, was \$5.59, compared with \$4.60 in 1921. In his general remarks, Judge Gary says:

"The steel industry in the United States in the year 1922 showed a substantial recovery from the unusually low volume of 1921, both in respect of new business offered and production output. The aggregate tonnage of orders booked by the subsidiary companies of the corporation during the year was slightly over 90 per cent of their estimated maximum annual capacity. But the greater part of this tonnage was entered during the second six months of the year, when, owing to the extended strike at the coal mines and of the railroad shopmen, operations were conducted under difficulties. As a result, the output of the steel making subsidiary companies for the entire year averaged only 71.3 per cent of their capacity, exceeding materially, however, the output in 1921, in which year the average was 47.5 per cent of capacity. During the first quarter of 1922, the output was but 57 per cent of capacity. The interruptions in operations caused by the strikes mentioned, as well as the increased cost of coal, together with an increase of about 20 per cent in wage rates effective on Sept. 1, resulted in increasing costs of operation to an extent which was not balanced by the slight advances

Production for Two Years				
Products	1922 Tons	1921 Tons	1922 Increase Tons	Per Cent
<i>Ores Mined</i>				
In the Lake Superior region (iron ore)—				
Missabe and Vermilion ranges.....	16,549,588	12,065,390	4,484,198	37.2
Gogebic, Menominee and Marquette ranges.....	2,477,672	2,415,802	61,870	2.6
In the Southern region—Alabama (iron ore).....	2,545,242	1,941,490	603,752	31.1
In Brazil, S. A. (manganese ore).....	205,677	225,199	19,522*	8.7
Total	21,778,179	16,647,881	5,130,298	30.8
<i>Limestone quarried</i>	5,633,186	4,607,486	1,025,700	22.3
<i>Coal Mined</i>				
For use in the manufacture of coke.....	16,778,413	14,546,103	2,232,310	15.3
For steam, gas and all other purposes.....	6,515,058	7,081,836	566,778*	8.0*
Total	23,293,471	21,627,939	1,665,532	7.7
<i>Coke Manufactured</i>				
In bee-hive ovens.....	3,431,846	1,698,178	1,733,668	102.1
In by-product ovens.....	9,805,212	8,127,086	1,678,126	20.6
Total	13,237,058	9,825,264	3,411,794	34.7
<i>Blast Furnace Production</i>				
Pig iron	11,885,179	8,547,199	3,337,980	39.1
Spiegel, ferromanganese and ferrosilicon.....	141,984	131,063	10,921	8.3
Total	12,027,163	8,678,262	3,348,901	38.6
<i>Steel Ingot Production</i>				
Bessemer ingots	4,068,578	2,950,897	1,117,681	37.9
Open-hearth ingots	12,013,807	8,015,450	3,998,357	49.9
Total	16,082,385	10,966,347	5,116,038	46.7
<i>Rolled and Other Finished Steel Products for Sale</i>				
Steel rails (heavy and light tee and girder).....	1,225,999	1,480,049	254,050*	17.2*
Blooms, billets, slabs, sheet and tin plate bars.....	673,099	409,767	263,332	64.3
Plates	1,410,414	723,355	687,059	95.0
Heavy structural shapes.....	936,733	439,762	496,971	113.0
Merchant bars, hoops, skelp, light shapes, etc.....	2,456,915	1,125,961	1,330,954	118.2
Tubing and pipe.....	1,178,611	984,285	194,326	19.7
Wire rods	158,495	88,232	70,263	79.6
Wire and wire products.....	1,404,663	915,651	489,012	53.4
Sheets (black and galvanized) and tin plates.....	1,504,121	1,024,542	479,579	46.8
Finished structural work.....	301,248	272,621	28,627	10.5
Angle splice bars and all other rail joints.....	218,538	198,397	20,141	10.2
Spikes, bolts, nuts and rivets.....	72,531	60,291	12,240	20.3
Axles	96,403	22,567	73,836	327.2
Steel car wheels.....	78,247	35,101	43,146	122.9
Sundry steel and iron products.....	69,314	79,753	10,439*	13.1*
Total	11,785,331	7,860,334	3,924,997	40.9
<i>Miscellaneous Products</i>				
Zinc	59,818	33,426	26,392	79.0
Sulphate of iron.....	32,389	24,499	7,890	32.2
Fertilizer—"Duplex basic phosphate".....	16,513	14,528	1,985	13.7
Fertilizer—Sulphate of ammonia.....	123,118	117,496	5,622	4.6
Ammonia (as liquor).....	3,816	3,620	196	5.4
Benzol products	119,373	113,354	6,019	5.3
Universal Portland cement.....	Bbl. 13,168,000	Bbl. 12,499,000	Bbl. 669,000	5.4

*Decrease.

Comparative Income Account

For the fiscal years ending Dec. 31, 1922, and 1921.

	1922	1921	+ Increase — Decrease
Earnings—Before charging interest on bonds and mortgages of subsidiary companies:			
First quarter.....	\$21,303,631.59	\$34,342,006.44	— \$13,038,374.85
Second quarter.....	29,330,255.01	23,911,921.99	+ 5,418,333.02
Third quarter.....	29,596,455.29	20,916,498.75	+ 8,679,956.54
Fourth quarter.....	29,558,574.43	21,620,852.32	+ 7,937,722.11
Total for year.....	*\$109,788,916.32	*\$100,791,279.50	+ \$8,997,636.82
Less, interest on outstanding bonds and mortgages of the subsidiary companies	8,259,605.93	8,065,221.58	+ 194,384.35
Balance of earnings.....	\$101,529,310.39	\$92,726,057.92	+ \$8,803,252.47
Less, charges and allowances for depletion and depreciation applied as follows, viz.:			
To depreciation and replacement reserves and sinking funds on bonds of subsidiary companies.....	33,382,624.09	27,905,045.44	+ 5,477,578.65
To sinking funds on U. S. Steel Corporation bonds.....	9,305,884.70	8,863,180.35	+ 442,704.35
Net income in the year.....	\$58,840,801.60	\$55,957,832.13	+ \$2,882,969.47
Deduct:			
Interest on United States Steel Corporation bonds outstanding	19,232,304.87	19,679,582.49	— 447,277.62
Premium paid on bonds redeemed, viz.:			
On subsidiary companies' bonds.....	150,205.98	27,835.57	+ 122,370.41
On United States Steel Corporation bonds.....	724,873.04	719,626.39	+ 5,246.65
Balance	\$38,733,417.71	\$35,530,787.68	+ \$3,202,630.03
Add: Net balance of sundry receipts and charges, including adjustments of various accounts.....	920,037.52	1,086,229.51	— 166,191.99
Dividends on United States Steel Corporation stocks, viz.:	\$39,653,455.23	\$36,617,017.19	+ \$3,036,438.04
Preferred, 7 per cent.....	25,219,677.00	25,219,677.00	—
Common, 5 per cent.....	25,415,125.00	25,415,125.00	—
Deficit provided from undivided surplus.....	\$10,981,346.77	\$14,017,784.81	— \$3,036,438.04

*Balance of earnings after making allowances for estimated amount of Federal income taxes.

panies during the year, as represented by their combined gross sales and earnings, was \$1,092,697,772, as compared with \$986,749,719 in the preceding year.

This amount represents the gross value of the commercial transactions conducted by the several subsidiary companies, and includes sales made between the

Inventories

	Dec. 31, 1922	Dec. 31, 1921
Ores—Iron, manganese and zinc...	\$76,275,064	\$84,725,188
Limestones, fluxes and refractories	5,091,428	4,440,739
Coal, coke and other fuel.....	10,807,030	13,954,195
Pig iron, scrap, ferromanganese and spiegel	12,374,219	18,869,057
Pig tin, lead, spelter, copper, nickel aluminum and dross and skimmings	8,288,802	7,714,557
Rolls, molds, stools, annealing boxes, etc.	11,591,006	13,123,821
Ingots—Steel	2,533,616	1,573,879
Blooms, billets, slabs, sheet and tin plate bars, etc.....	16,283,993	22,782,293
Wire rods	1,499,913	1,363,220
Skelp	1,588,148	1,785,049
Finished products	47,619,421	56,599,667
Manufacturing supplies, stores and sundry items not otherwise classified	35,578,946	37,050,148
Mining supplies and stores (for ore and coal properties).....	7,256,390	7,291,199
Railroad supplies and stores.....	6,210,753	7,953,241
Merchandise of supply companies..	1,818,297	1,363,816
Material, labor and expense locked up in uncompleted bridge, structural and other contract work	\$26,638,598	
Less bills rendered on account	21,097,612	
	5,540,986	1,024,532
Stocks abroad and on consignment	12,940,727	17,260,930
Material in transit.....	6,868,594	4,239,093
Total	\$270,167,333	\$302,214,624
Less, inventory reserve.....	49,460,082	60,710,255
Balance	\$220,707,251	\$241,504,369

subsidiary companies and the gross receipts of the transportation companies for services rendered both to subsidiary companies and to the public.

The earnings for the year resulting from the above gross business represent the combined profits accruing to the several corporate interests in the respective sales and services rendered, each of which is in itself a complete commercial transaction.

Employees and Pay Rolls

The average number of employees in the service of all companies during the year, and the total salaries and wages paid in comparison with corresponding results for the preceding year, were as follows:

Employees of	1922 Number	1921 Number
Manufacturing properties.....	150,847	133,963
Coal and coke properties.....	26,856	22,451
Iron ore properties.....	11,906	11,184
Transportation properties.....	21,523	20,010
Miscellaneous properties.....	3,799	4,093
Total	214,931	191,700
Total salaries and wages paid...	\$322,678,130	\$332,887,505

Average Earnings per Employee per Day for Year:

All employees, exclusive of general administrative and selling force	\$4.78	\$5.51
Total employees, including general administrative and selling force	4.91	5.72

Average earnings per employee per day in month of December....

5.59 4.60

Capital Expenditures

The expenditures made by the corporation and the subsidiary companies during the year for the acquisition of additional property, new plants, extensions and improvements, including net stripping and development expense at mines, equaled the sum of \$29,571,662, classified generally as follows:

Manufacturing properties	\$16,076,739
Coal and coke properties.....	5,987,117
Ore properties, including net additional expenditures for mine stripping and development.....	2,961,883
Railroads and lake docks.....	2,709,614
Great Lakes and ocean steamers.....	1,051,611
Limestone, gas and water properties, land companies, etc.	784,698
Total expended	\$29,571,662

Miscellaneous

Pensions. Pensions were paid during the year by the trustees of the United States Steel and Carnegie Pension Fund to retired employees to the amount of \$1,266,661, compared with \$947,879 disbursed for similar purpose in the preceding year. Pensions were granted during the year to 745 retiring employees. At the close of the year there were 3886 names on the pension rolls, a net increase of 449 during the year.

Foreign and Domestic Shipments

Domestic Shipments	1922 Tons	1921 Tons	Increase	
			Tons	Per Cent
Rolled steel and other finished products.....	10,708,022	6,832,038	3,875,984	56.73
Pig iron, ingots, ferromanganese and scrap.....	273,963	142,715	131,248	91.97
Iron ore, coal and coke.....	740,380	618,729	121,651	19.66
Sundry materials and by-products.....	109,082	103,265	5,817	5.63
Total tons all kinds of materials, except cement.....	11,831,447	7,696,747	4,134,700	53.72
Universal Portland cement (bbl.).....	13,548,544	12,211,285	1,337,259	10.95
Export Shipments				
Rolled steel and other finished products.....	1,203,882	1,126,795	77,087	6.84
Pig iron, ferromanganese and scrap.....	3,377	978	2,399	245.30
Sundry materials and by-products.....	90,894	80,384	10,510	13.07
Total tons all kinds of materials.....	1,298,153	1,208,157	89,996	7.45
Aggregate tonnage of rolled steel and other finished products shipped to both domestic and export trade.....	11,911,904	7,958,833	3,953,071	49.67
Total Value of Business (covering all of above shipments, including cement and completed steamships delivered and other business not measured by the ton unit)				
	1922	1921	Increase or Decrease	
			Amount	Per Cent
Domestic (not including inter-company sales).....	\$646,592,293	\$563,093,812	\$83,498,481	14.83 Inc.
Export	75,311,489	92,313,756	17,002,267	18.42 Dec.
Total	\$721,903,782	\$655,407,568	\$66,496,214	10.15 Inc.

Since the inauguration of the plan in 1911, an aggregate of \$8,095,122 has been paid in pensions.

Accident Prevention. Expenditures amounting to \$1,175,171 were made during the year for accident prevention and safety work, in comparison with \$1,061,685 expended in the preceding year. The number of serious and fatal accidents in 1922 per 100 employees was 7.94 per cent less than in 1921, and 56.88 per cent less than in 1906. The total number of disabling accidents of all kinds per 100 employees was 18.83 per cent less than in 1921, and 71.07 per cent less than in 1912.

Accident Relief. The subsidiary companies disbursed during the year for work accidents (including accruals not yet actually payable under State compensation laws) a total of \$4,170,945, compared with an outlay of \$4,409,211 in the previous year. Of the total disbursed in 1922, upwards of 90 per cent was paid or is payable directly to the injured employees or their families.

Sanitation. During the year there were expended by the subsidiary companies \$2,252,975 in providing modern sanitary facilities for the comfort and health of

employees at plants, mines and other operating departments. At the close of the year there were in and about the plants and works 2074 comfort stations with adequate toilet facilities, equipped with 23,016 washing faucets and basins; also 5416 showers, 152,806 lockers and 4435 sanitary drinking fountains.

Housing and Welfare. At the close of 1922, the subsidiary companies had advanced or loaned employees the net sum of \$8,143,005 on contracts or mortgages, carrying interest at 5 per cent and payable in installments over a period of years, to assist them in acquiring homes under the corporation's home-owning plan. The activities of the subsidiary companies in conducting work and efforts for the general welfare of employees and their families, to which references have been made in previous reports, have been consistently continued. The corporation's Bureau of Safety, Sanitation and Welfare has recently issued its Bulletin No. 9 describing and illustrating the wide range of activities conducted for the benefit of employees and the betterment of their conditions generally. A copy of this bulletin will be sent on request.

Rail Failures Reflect War Conditions

Statistics Show Disturbed Manufacturing Situation, as Well as Under-Maintenance of Roadbed, Due to the War, Responsible for Decline in Rail Performance

A NOTHER increase in rail failures was shown in the report of the Committee on Rail presented at the twenty-fourth annual convention of the American Railway Engineering Association held at the Congress Hotel, Chicago, March 13 to 15 inclusive. Statistics are for the period ended Oct. 31, 1921, and cover the rollings for 1916 and succeeding years. The tonnages and track miles of rail represented by the statistics in this report are as follows:

Year Rolled	Tons	Track Miles
1916.....	1,162,837	7,820.14
1917.....	1,057,611	7,025.25
1918.....	944,899	6,313.98
1919.....	929,931	6,271.82
1920.....	1,118,187	7,374.71
1921.....	726,132	4,797.22

The average results of all the rails reported on together with the results taken from previous reports including both Bessemer and open-hearth rails are shown in the ensuing table. The measure of the performance of the year's rolling is taken as the failures per 100 track miles for five years' service.

Average Failures per 100 Track Miles						
Year Rolled	Year's Service					
	0	1	2	3	4	5
1908....	....	....	....	....	....	398.1
1909....	....	....	....	....	224.1	277.8
1910....	....	....	....	124.0	152.7	198.5
1911....	....	....	77.0	104.0	133.3	176.3
1912....	....	28.9	32.1	49.3	78.9	107.1
1913....	2.0	12.5	25.8	44.8	69.5	91.9
1914....	1.2	8.2	19.8	32.9	50.9	74.0
1915....	0.7	8.9	19.0	34.2	53.0	82.4
1916....	1.6	11.8	29.2	47.7	70.6	105.4
1917....	5.3	21.6	38.9	66.0	110.5	....
1918....	1.6	8.9	27.6	54.0	....	....
1919....	2.0	14.8	39.4	....	....	....
1920....	3.9	14.2	....	....	....	....
1921....	1.6	....	....	....	....	....

It is to be noted that a remarkable decline in failures notwithstanding steadily increasing average wheel loads continued until the 1915 rollings. The 1916 rollings showed another increase in failures which will no doubt be augmented by the record for the next year covered by the statistics. This sharp change in the trend of failures is due to the disturbed manufacturing conditions and the undermaintenance of roadbed during the war. While the effect of war conditions will continue to be reflected in the reports for the next two

or three years, the committee believes that the intensive study of metallurgical practice in the production of gun and other fine steels, necessitated by the conflict, is now resulting in better rail mill practice. The combination of better steel with rehabilitated roadbeds, in its opinion, should soon show better rail performances in track than have ever been known.

Another table presented by the committee shows a general increase in the average weight of rails rolled by mills in this country and Canada. While the general trend is upward, slight recessions in the averages are to be noted in the years 1918 and 1919 and 1921.

The committee also presented specifications for quenched carbon steel and alloy steel track bolts and for coiled spring washers for adoption by the association and inclusion in the manual of that organization. The committee also reported progress on the studies of rail joint design and the design of 150-lb. rail sections.

The registration at the convention was 833, as compared with 859 last year. New officers elected included: President, E. H. Lee, vice-president and chief engineer, Chicago & Western Indiana, Chicago; first vice-president, G. J. Ray, Delaware, Lackawanna & Western; second vice-president, J. M. R. Fairbairn, chief engineer, Canadian Pacific, Montreal, Que.; secretary, E. H. Fritch, treasurer, George H. Bremner, Chicago, Burlington & Quincy, Chicago.

At the conclusion of the meeting, a resolution was passed recommending that the railroads give serious consideration to the holding of a celebration commemorating the one hundredth anniversary of American railroads.

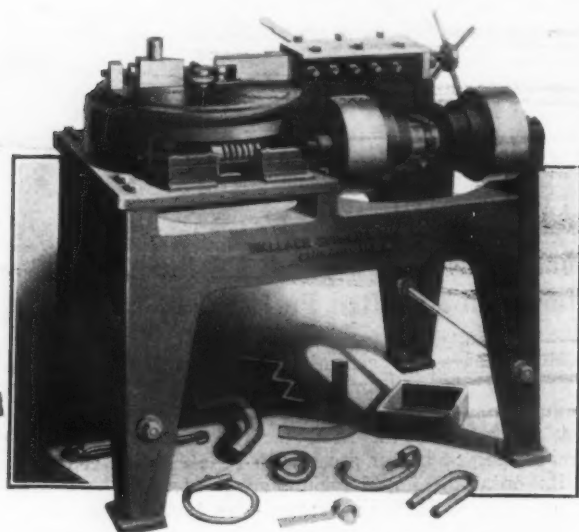
Dr. John S. Unger, chief of research bureau, Carnegie Steel Co., in a talk to the Lutheran Brotherhood at the First Lutheran Church, Pittsburgh, Monday evening, March 12, gave some interesting facts as to the uses of iron. He said that the amount of iron annually used in the United States was equal to 840 lb. for each man, woman and child, and that American women carried several thousand tons of iron in the form of the wire used in making their hats, while about one-twelfth of the total production went into tin cans for foods, etc., and the cans when emptied usually reached the dump heaps and were used only once. This Dr. Unger characterized as waste.

Bending Machine for Bars and Angles

A machine for cold or hot bending of square bars, rounds, flats and angles has been placed on the market by the Wallace Supplies Mfg. Co., 418 Orleans Street, Chicago.

For cold bending the capacity is: Squares and rounds, 1 in. and under; flats, $\frac{3}{4}$ x 2 in., on edge or flatwise, and under; angles, 2 x 2 x $\frac{1}{4}$ in. and under. Squares and rounds 1½ in. and under, flats $\frac{3}{4}$ x 2 in. and under, and angles 2½ x 2½ x 5/16 in. and under may be bent hot. The radius of bend must be limited to a maximum of 4 in. from the center of the circle to the outside edge of the material.

Production varies according to the number of degrees to which the material is bent, length and kind of stock, and size of section. The forming of materials on edge or the bending of angles consumes more time than ordinary rods or bars. The production of the



Machine for Cold and Hot Bending. An adjustable stop mechanism permits automatic stopping of the table at any point

latter, and also of flats bent flatwise, is said to average 150 pieces an hour, which is ordinary cold bending to 180 deg. The average output of flat stock on edge, bent cold, is said to be about 100 pieces an hour, the same applying to angle iron. In the bending of flat stock on edge or of angle iron to more than 180 deg., the average production is about 60 pieces per hour. In this case the use of a "split form" is necessary and the upper part of the form is lifted after each bend has been made, to permit removing the finished part from the machine.

The speed of the rotating table is 6 r.p.m. An adjustable stop mechanism on the under side of the machine permits stopping the table automatically at any predetermined point. This feature facilitates the bending of materials identically to any desired number of degrees.

The machine is designated as the No. 15. Starting is by means of the hand lever located on the front and which is on the side opposite to the tight and loose pulley. The floor space occupied is 3 x 4 ft., and the height is 3 ft. A 3-hp. motor is said to furnish ample power to operate the machine.

Pittsburgh Base Hearings

WASHINGTON, March 20.—Hearings in the Pittsburgh base case will be resumed in Chicago next Monday, according to present plans, it was announced at the offices of the Federal Trade Commission. The United States Steel Corporation expects to close its side of the case about June 1, after which the commission will present rebuttal testimony. The further hearings in Chicago, it is expected, will consume about two weeks, after which they will be transferred to Birmingham, Ala., and then to New York.

Pronounced Activity General

All signs point to a continuance of the increasing business of the past few months. The report for January of the Department of Commerce shows so many elements of high productivity that January stands out as a particularly active month.

Activity of woolen machinery increased. Cotton spindles made a new high record at 9,266,000,000 hr., with an average of 249 hr. per spindle. Copper production at 110,589,000 lb. made a new high record since 1920, and was more than four times as large as January, 1922. Gasoline figures for December made a new high record of production at 585,000,000 gal. Production of gas and fuel oil also made a new high record in December. Output of automobiles in January was the largest since last August, and one of the largest on record.

Building contracts in January were about 30 per cent larger than in January, 1922. Lumber production showed a large increase over December and over January, 1922. Large increases in January were made in orders and shipments of sanitary enamel ware. New high records since 1919 were made in shipments of both bathtubs and sinks.

Refractory brick, both silica and fire clay, had increases in production, shipment and stocks during January. Clay fire brick production made the highest record since 1919 and silica brick the highest since 1920. Production of sole leather was the largest in the year.

Bad order freight cars were less numerous in January than at any time in two years. The tonnage of ships under construction in January was the highest since November, 1921.

Farm implement and mail order sales have been stimulated through better prices paid to the farmer for his products. Sales of chain stores were over 20 per cent larger in January than in January, 1922. Savings deposits in commercial banks increased in all districts except New York.

Coal Storage to Stabilize the Industry

WASHINGTON, March 16.—Safe storage bituminous coal is probably the only solution of the problem for stabilizing the coal industry, according to investigators of the United States Bureau of Mines and the Carnegie Institute of Technology, who have just completed a study of the spontaneous combustion of soft coal. As long as the peaks of demand react back to the miners, the coal industry will be a seasonal one, with a resultant unsatisfactory labor situation, state Joseph D. Davis, fuel chemist, and John F. Byrne, research fellow, who conducted the investigation. If some system could be devised whereby coal could be stored economically, with little deterioration and danger of spontaneous combustion, the mines would be operated practically the whole year—say, 300 working days, instead of 180 to 270 days as in 1920—at a uniform rate of production. Unfortunately, no such general storage system has yet been devised.

Decline in Steel-Furniture Shipments

Shipments of steel-furniture stock goods declined slightly in February, according to figures received by the Department of Commerce through the Bureau of the Census, in cooperation with the National Association of Steel Furniture Manufacturers. The daily rate of shipment, however, was slightly greater than in either January or December and was the highest since October, 1920.

Total shipments of steel-furniture stock goods reported by 22 manufacturers amounted to \$1,307,173 in February, as against \$1,362,470 in January and \$967,125 in February, 1922. Comparisons of the shipments for the last four months follow:

Shipments of Steel-Furniture Stock Goods			
	1922-3		1921-2
November	\$1,204,310		\$890,362
December	1,376,152		1,027,417
January	1,362,470		983,834
February	1,307,173		967,125

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY

WILLIAM W. MACON

GEORGE SMART

C. S. BAUR, *General Advertising Manager*

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Activity with Conservatism

Manufacturing consumers of iron and steel are pursuing a policy both in their buying and selling which gives little warrant for concern lest the present situation develop an early repetition of the excesses of 1919 and 1920. Based on their study of plotted curves representing volume of business, the course of commodity prices and conditions in the money market, the makers of index charts continue to prophesy expanding business and maintained or higher wholesale prices throughout the year. The predictions for 1923, made as the year came in, commonly stopped with the first six months in their estimates of favorable conditions. In the past six weeks the developments in iron and steel have persuaded many in the trade that the period of active business is likely to last well on toward the end of the year and that profits will be much more satisfactory in the second half than in the first half.

Here and there a caution has been sounded against too rapid advances in iron and steel prices and against any such competition among buyers as was so much in evidence in the first half of 1920 and with such serious consequences. There are signs that such cautions are meeting with a very different reception from that of 1919. Then the common answer was that a new era had dawned and that the war had done away with all charts and curves, and all the stereotyped talk of business cycles. It is evident that the hundreds of manufacturers who were swept off their feet three and four years ago have not forgotten how much they paid for believing that since depression did not follow immediately the making of peace, prosperity had come in its place and for an indefinite period.

It is fortunate that something is now being said about the possible effect of continued advances in steel prices upon the volume of buying. It is recognized that while building costs have been rising steadily in the past year new construction has gone on increasing; at the same time it is fully appreciated that the day when mounting costs will slow down operations may be near at hand. In other lines likewise the rising tide of business is clearly seen, but it is not overlooked

that prices may go too high, with the inevitable reaction.

Speculative buying of steel figures very little in the present situation, and the steel companies find small indication of duplicate orders—a factor that figured largely in the slump of 1920. In this as in other respects the present movement has been free from unhealthy factors and to that extent carries its own insurance against early reaction.

Prompt Tariff Action

The business interests of the country are indebted to President Harding for ending the deadlock in the Tariff Commission which had prevented any action being taken under the so-called flexible provisions of the Fordney-McCumber act. The contention of some members of the commission for a general investigation of the tariff, to be followed by a thorough revision, meant intolerable delay. After the many months of hearings and speech-making which took place in the last Congress, there would have been an indefinitely long time consumed in delving into the intricacies of the tariff and hearing the arguments of all interested. While scientific revision may be regarded as an ideal, it certainly is true that some features of the new tariff law call for prompt investigation, while others can wait until the more urgent cases are disposed of.

It may be admitted that the duty on pig iron, which is one of those to be investigated, is not so important as some other duties, notably those on ferromanganese and manganese ores, but the pig iron investigation need not be prolonged. It is hoped also that the other sixteen investigations will be expedited, so that tariff rates which are really hampering industries and in some cases causing unjustifiable increases in prices will be thoroughly inquired into. The real point is that a start has been made in the right way, and that relief from inequitable rates can be expected within a reasonable period.

The extent to which the automobile industry is a consumer of copper appears from the results of

a study by the Copper and Brass Research Association, recently made public. About 108,280,000 pounds of copper was consumed in the construction of the automobiles made in 1922, while 70,280,000 pounds went to that industry in 1921. The association's statement is that the average use of copper per unit of output is about 30 pounds, whereas at 2,577,765 cars and trucks produced in 1922, the copper average per unit figures out 42 pounds. Using the same basis of comparison, the copper per unit in 1921 was also about 42 pounds. Thus of the total production of refined copper in 1922 and 1921 the automobile industry used from 7.60 to 7.70 per cent.

Measuring Business Activity

Freight ton-mileage on the railroads is now reported for last December at 36,222 millions. This represents an increase of 41 per cent over December, 1921, and an increase of 4 per cent over December, 1920. To show an increase over December, 1920, is not, of course, to show an increase over the average of the year 1920, for industrial activity had fallen off greatly by the end of that year. Comparing calendar years, the ton-mileage of 1922, 375,633 millions, was 9 per cent over that of 1921 and 16 per cent under 1920. The difference between 1920 and 1922 was that the former showed decreasing industrial activity in the latter part of the year, while 1922 showed almost constantly increasing activity. The high month of 1922 in freight movement was October, but that was merely seasonal.

While freight ton-mileage is commonly cited as suggesting the volume of business activity, the production of pig iron is more often referred to. Neither is an exact index, for our activities vary in character from time to time. There is no consistent standard according to which, if there is a certain amount of business activity it will require so many barrels of cement, so many tons of pig iron, so much freight movement, and so on. As freight movement and pig iron are both cited as indices, however, it may be interesting to note what the relation between the two has been in the past three years.

Adding together for the years 1920, 1921 and 1922 the freight ton-mileage and then the pig iron production and dividing the former into the latter a factor is found, and this factor may be used as a standard, a corresponding factor computed for any month or year being related to it. On this basis, 1920 stands at 119, 1921 at 70 and 1922 at 105. That is, in 1920 the pig iron production ran very high relative to the total volume of traffic, in 1921 it ran very low and in 1922 it ran a trifle high. There was a slump in pig iron production in 1921 and there was less decrease in the freight movement. This, of course, is what one would expect. While pig iron is not stocked to any extent, the products of pig iron can accumulate and a liquidation may be necessitated. Freight movement cannot run ahead correspondingly. Building and road materials, food products, etc., are moved much as they are produced and ultimately consumed.

The relatives mentioned above were computed

for the respective calendar years. With the same standard, the relatives were 114 for December, 1920, 94 for December, 1921, and 124 for December, 1922. The highness of the relative for last December means in part that pig iron production was rather heavy on a general basis, but the highness is due in part also to freight movement being normally smaller in December than the average of a whole year.

At no time in 1922 was the freight business offered the railroads as heavy as in a few previous years, but in the late months of the year the volume was not far below previous high points. It follows that if there is any great increase this year, over the late months of last year, in the volume of business activity involving transportation, either the railroads will function considerably better than at any previous time or there will be transportation trouble. Seeing that the record for a month in freight ton-miles was made in August, 1920, when the railroads were still short of labor, there is a chance for them to make new records this year.

A Better Pig Iron Year

Production of pig iron in the United States in 1922 is reported by the American Iron and Steel Institute at 27,219,904 tons, this including 224,904 tons of charcoal iron. THE IRON AGE has reported the production monthly, with the exception of charcoal iron, the issue of Jan. 4, 1923, showing the year's total at 26,880,383 tons. The difference in the statistics is 114,790 tons, or about one day's production at the present rate. Thus in the first week of January our readers had substantially correct information.

Last year was a better pig iron year than was expected at its beginning, with the very low production of 1921 as a basis on which improvement was to be reckoned. It seemed very sanguine to expect 1922 to show 25 or 40 per cent greater output than 1921. The actual gain was 63 per cent, and yet by long range comparison it was a poor year. It was merely a much better year than 1921. The record output was made in 1916, 39,434,797 tons, and 1921 was 57 per cent below that record, while 1922 was only 31 per cent below it. Together the two made the poorest pair of years in the history of the iron industry. There has been, furthermore, a period of six years in which no new record for pig iron production has been made. Between 1895 and 1916 the longest spell between new records was two years, 1914 and 1915, other recessions being only for a single year. For a four-year intermission one must go back to 1891-4 and for a five-year intermission to 1874-8.

Whether this year will break the 1916 record remains to be seen. Continuance of the rate of production at the beginning of this month, as shown by the last blast furnace report of THE IRON AGE, would exceed the 39,435,000 tons of 1916 with nearly 2 per cent to spare.

Basic pig iron reached a distinguished position in 1922, for the first time constituting more than half the total production of pig iron. The proportion of basic iron to total iron was 50.85

per cent in 1922, against 45 to 47 per cent in each of the preceding six years, 40 per cent in 1913 and 21 per cent in 1907. The increase in basic iron was partly at the expense of Bessemer iron and partly at the expense of foundry grades. Foundry and malleable constituted 23.6 per cent of the total in 1907 and 18.5 per cent in 1922.

Nearly all the basic pig iron made in 1922 by steel makers was used molten. The total production of basic iron was 13,841,367 tons, while the amount cast was 2,696,766 tons, the remainder being delivered molten. The quantity made for sale was 1,198,106 tons, and on the assumption that all this was cast, the amount cast by the producer-consumer class was 1,498,660 tons, or 12 per cent. Late in the year there was replenishment of reserves of pig iron and some of the iron cast is thus accounted for.

For the first time in the history of pig iron production statistics no anthracite iron is reported. There were five furnaces still classified as anthracite stacks, although in recent years they have been using coke mixed with anthracite, and all were idle during 1922. The maximum production of anthracite iron was in 1890—2,186,411 tons.

Reducing Illness in Shop Forces

Comparisons of years to show the results of health work in industry are quite unsatisfactory because normal experience has been upset by the epidemics of influenza which have swept over the country. Anything approaching exact information as to the practical benefits resulting from this phase of management has been difficult to obtain, in spite of careful study and analysis carried on in many establishments. Certain facts have been established, such as that while sickness varies in amount from year to year, the types of disease remain a constant; that diseases of the respiratory system are the chief cause of absenteeism; that sickness is vastly more prevalent, as reckoned in lost time, in winter than in summer; that malingering with sickness as the excuse is much more common in good times than in bad. While it is agreed that sickness prevention measures have worked out exceedingly well, and probably at an actual profit, really tangible evidence has been lacking until recently.

It has now been demonstrated that, in a plant employing nearly 18,000 people, disabling sickness has decreased very rapidly with increasing length of employees' service, in spite of the natural expectation that workers of long service would be a poorer health risk. The wholly logical deduction is that the influence of the health department of the plant was felt in a cumulative way and on a large scale.

In an analysis just published of the results obtained by the B. F. Goodrich Co., Akron, Ohio, in the two years ended Nov. 1, 1920, the United States Health Service tabulates the experience with some detail. The average annual number of cases of lost time sickness per thousand employees was 1735. Of the 4433 employees who had been in the company's employ less than three months the annual number of cases per thousand was

2497. With the 2500 in employment from three to six months the rate per thousand was 2437. In the period of six months to one year the rate fell to 1874 with 3060 employees, and from one to five years, with 5,256 employees it was 1,228 per thousand. In the final class, of workers in the company's employ more than five years, the rate decreased to 575. In other words sickness among the newcomers in the plant was nearly five times as prevalent as with the old employees.

Figures obtained by the Norton Co., Worcester, Mass., substantiate the Goodrich experience, in that there is more sickness which causes lost time in the first three months of employment than in the second three months, and less in the third three months than in the second.

The Public Health Service report says, referring to the apparent anomaly of the results: "One would expect an older age distribution and, consequently, a higher sickness rate among persons who had been with the company for five years and more. The rate, however, for this group and for those from one to five years service is so much lower than the average sickness frequency that the efficacy of industrial medical work appears to be demonstrated statistically."

CORRESPONDENCE

Welding a Steam Shovel Shaft

To the Editor: An example of the possibilities of electric welding under limited facilities is shown in the accompanying illustration of the welding of a steam



shovel shaft in the shop of the Miami Electric Welders, Miami, Fla.

The shaft welded was 7 in. in diameter and 12 ft. 8 in. long, and with the two sprockets and two gears mounted on it, weighed 6280 lb. It was broken at the journal in the center. The shaft was set up on four 3 x 10 x 18 in. hard pine V-blocks upon a 1 in. x 12 in. x 12½ ft. board as shown, the V-blocks being held in place by two 1 x 4 in. side strips. This was the only fixture employed in centering and lining up the shaft.

The jack shown underneath the shaft was used to keep the same tension on the shaft as the weld progressed.

On each side of the break a cut of 45 deg. was made, leaving $\frac{1}{8}$ in. clearance in the center. The core was then welded for a space of 2 in. in diameter with a $\frac{1}{8}$ -in. Armco welding rod, which was followed with $\frac{5}{32}$ -in. for 2 in., turning the shaft continually. After that chrome nickel steel, $\frac{3}{16}$ in. in diameter was used until the welding of the shaft was completed. The arc was operated at 32 volts, 200 amperes on the $\frac{1}{8}$ in. and $\frac{5}{32}$ in. rod, and at 45 volts, 200 amperes on the $\frac{3}{16}$ in. rod.

The illustration shows the finishing up of the shaft, with the grinder at work truing the journal. The shaft proved to be true in every way, and was put into service one hour after it left the shop. The shovel using the shaft is at present doing duty 16 hours a day. The same V-block set-up was employed in welding a broken crank shaft weighing 1200 lb., the break being at the No. 6 throw. This job was unusually successful also, and we regard these two pieces of work as remarkable in the field of electric welding.

H. J. SPANIER,

Miami, Fla.

President, Miami Electric Welders

NEW MANAGEMENT ASSOCIATION

Change in Name and Status of National Personnel Organization

The National Personnel Association has become the American Management Association. The change was made at a well-attended meeting of the membership at the Bankers' Club, New York, on Wednesday, March 14. The name, National Personnel Association, which has been in use for about a year, was found to indicate too little of the purpose and scope of the work carried on. The new name, it is expected, "will emphasize the final responsibility of the line organization in the personnel job, will recognize its interrelation with the whole management problem and will appeal to the works manager, the sales manager and the office manager." In explanation of the new name the phrase will be carried, "Devoted exclusively to the consideration of the human factor in commerce and industry."

W. W. Kincaid, president of the Spirella Co., Niagara Falls, N. Y., is president, and Sam A. Lewisohn, vice-president Miami Copper Co., New York, is one of the vice-presidents of the new association. The directors include John McLeod, assistant to the president, Carnegie Steel Co., Pittsburgh; Elisha Lee, vice-president Pennsylvania Railroad Co.; E. K. Hall, vice-president American Telephone & Telegraph Co.; A. H. Young, manager of industrial relations, International Harvester Co.; S. B. Bunker, industrial relations division, General Motors Co., and C. R. Dooley, manager of personnel and training, Standard Oil Co. W. J. Donald, 20 Vesey Street, New York, is managing director.

Charles R. Hook, vice-president and general manager American Rolling Mill Co., Middletown, Ohio, addressed the conference on the "Human Side of Production Management." "Leaders of American industry must carry to the rank and file of the workers a clear and simple explanation of the problems of business as they relate to financing, production and marketing," he declared. That the problem of industrial America is not just more production, but more units of production per man per day, was emphasized. One part of the problem deals with improved machinery to reduce the number of men needed per unit of product and the other affects individual efficiency and reward.

"I find too often," said Mr. Hook, "that chief executives feel that it is not their particular responsibility or function to concern themselves about the human side of production; their job is to find a production manager, watch the cost sheets, and hold him responsible. This is fine in theory, but bad in practice." Mr. Hook told of the cooperative work with employees which has produced such excellent results at Middletown, and was roundly applauded in connection with the exhibit he made of marked reduction in accidents in hot mill operations.

"Correlation of Sales and Production" was discussed by Howard Coonley, president Walworth Mfg. Co., Boston. He told of the success of his company in developing a method for estimating the demand for its product in advance. The aim was to make employment as continuous as possible in spite of the seasonal factor which is conspicuous in the trade in valves for steam, gas and water pipes. It was necessary to make estimates a year in advance to anticipate the peak reached in autumn months.

Upon my original study I was amazed to find that we turned out 23,000 different finished products. By classification we grouped them into 39 classes, and later reduced that grouping to 14. We then studied the seasonality of sales, and were surprised to find that fluctuations were very definite, coinciding accurately with the business cycles charted by the Harvard Economic Service and the reports of building permits. The first year that we adjusted ourselves to the new departure was in 1922, when we estimated that sales would run 43 per cent above those of 1921. And at the end of the year we found the estimate very accurate, the actual increase having been 44 per cent.

This policy enabled us to meet every requirement and to give men work for the whole year. This meant that we could promise continuous employment, could tell our purchasing agents what and when to buy and our financial department the amount that would be necessary in dollars and when. Production was more economical, the men were better satisfied and constantly on the job and efficiency all around was improved. The proper study of sales possibilities and market conditions and the correlation of the production program thereto will bring about the best results in industrial relationships.

Mr. Lewisohn presided at the meeting and in a statement given in behalf of the officers and directors of the new association said in part: "Personnel work is an integral part of management interwoven into all of the efforts and activities of the production and sales departments and of the office. It cannot be segregated as an isolated function and all efforts to bring about such a separation are doomed to failure. There is ample experience to prove this sweeping statement."

Hyman-Michaels Co. Changes

Joseph Michaels, vice-president and general manager Hyman-Michaels Co., dealer in scrap and salvaged material, Chicago, has been elected president and treasurer. Joseph Hyman, president, becomes chairman of the board and other officers elected include: S. E. Purdy, first vice-president and secretary; W. J. Ross, second vice-president; William Rosenthal, second vice-president; Al Michaels, assistant treasurer, and Edward A. Lindenau, assistant secretary. All officers will have headquarters at Chicago, except Mr. Rosenthal, who is located at St. Louis. Directors include Joseph Hyman, Joseph Michaels, B. E. Michaels and S. E. Purdy. Coincident with the election of officers was an increase in capital stock from \$225,000 to \$1,500,000. The Hyman-Michaels Co. was organized in 1911, when it succeeded to the business of the Block-Pollak Co. At that time, it had a single office, that at Chicago, and did a gross business of from \$3,000,000 to \$4,000,000 a year. Today it has branch offices at New York, Pittsburgh, Detroit, St. Louis, Washington and San Francisco and does a business of approximately \$30,000,000 annually. The growth of the company has been concurrent with the development of the steel business, particularly in the Chicago district. In 1911 fully two-thirds of the scrap emanating from territory tributary to Chicago went to consumers farther East. Today the amount moving East is small. Joseph Michaels is a native of Cincinnati and began his connection with the scrap business as an office boy with the Block-Pollak Co.

The Hyman-Michaels Co. has purchased the Oklawaha Valley Railroad, a line running between Ocala and Palatka, Florida, and will dismantle it to sell the 40 and 60-lb. section rails, locomotives, cars and other material.

European Markets as Affected by Ruhr

Situation in France Improving—British Material in High Demand at Advancing Prices—More Furnaces Being Started

(By Cable)

LONDON, ENGLAND, March 20.—Pig iron is strong, with prices advancing on increased export demand. Additional furnaces are being relighted at Cleveland. The number of furnaces of all kinds now blowing is 45. Basic iron is unobtainable and quotations are only nominal. Of other grades, only moderate quantities are available for April delivery.

There is increased demand for finished iron and steel and prices are continually advancing. There have been good sales to Belgium and Germany. All supplies for prompt shipment are scarce.

The Continental position is unchanged. Belgian merchant bars are being offered at £11 10s. (2.41c. per lb.), f.o.b., for April and May delivery, but there are no buyers. France and Germany have agreed to waive export licenses on several shipbuilding steel contracts for British yards, which were placed in the Ruhr prior to the French occupation of that district. The total amount involved is about 120,000 tons.

French Furnaces in Operation

In France the position is slightly improved, on the resumption of Belgian supplies of fuel. In Lorraine the Redange-Dillingen works has banked one blast furnace at Redange. In Luxemburg the Acieries Reunies de Burbach-Esch-Dudelange (Arbed) has four furnaces in blast at Esch and four at Dudelange. All three Arbed furnaces at Dommeldange are banked. At the Hadir works four furnaces are blowing, and four of the Société Metallurgique des Terres Rouges at Esch. The Société Anonyme d'Ougrée Marihay has two of its four furnaces at Rodingen in operation, and Steinfort has one.

Coke Available in Ruhr

In Germany stocks of coke at the Ruhr pitheads are estimated at over 400,000 tons. French ironmasters are obtaining 400 tons daily by requisitioning for supplies.

In Czechoslovakia considerable improvement is noted. The Witkowitz Bergbau & Eisenhütten Gewerkschaft, at Witkowitz, has blown in five of its eight furnaces. The Prager Eisen Industrie Gesell-

schaft at Prague is lighting a second furnace and other plants are restarting.

Tin plate is firm, with prices advancing in anticipation of a further increase in costs. Buyers are offering 24s. (\$5.64) basis IC, f.o.b., for deliveries up to the end of June, while sellers are asking 24½s. (\$5.75) basis for April and May. Oil plates are quiet, but further business is anticipated.

Galvanized sheets are steady, with moderate demand. There is some inquiry from India. Black sheets are strong, Japanese specifications being sold at £21 (4.41c. per lb.), f.o.b. for July and August delivery. The works are sold out for five months ahead.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.70 per £1, as follows:

Durham coke, delivered	£1 19s.	& £2 0s.	\$9.16 to \$9.40
Cleveland No. 1 foundry	6 12½		31.14
Cleveland No. 3 foundry	6 7½		29.96
Cleveland No. 4 foundry	6 2½		28.79
Cleveland No. 4 forge..	5 17½†		27.61
Cleveland basic.....	6 2½†		28.79
East Coast mixed.....	6 2½	to 7 0	28.79 to 32.90
Ferromanganese	16 0		75.20
Ferromanganese*	16 0		75.20
Rails, 60 lb. and up...	9 15	to 10 0	45.82 to 47.00
Billets	8 10	to 9 10	39.95 to 44.65
Sheet and tin plate bars,			
Welsh	8 16	to 9 10	41.36 to 44.65
Tin plates, base box...	1 4	to 1 4½	5.64 to 5.75
			C. per Lb.
Ship plates.....	10 0	to 10 10	2.10 to 2.20
Boiler plates.....	12 10	to 13 0	2.62 to 2.73
Tees	10 15	to 11 5	2.26 to 2.36
Channels	10 0	to 10 10	2.10 to 2.20
Beams	9 15	to 10 5	2.05 to 2.15
Round bars, ¾ to 3 in.	11 10	to 12 0	2.41 to 2.52
Galvanized sheets, 24 g.	19 0	to 19 5	3.99 to 4.04
Black sheets, 24 gage..	13 10	to 13 15	2.83 to 2.89
Black sheets, Japanese			
specifications	15 5		3.20
Steel hoops	12 0	& 13 10*	2.52 & 2.83*
Cold rolled steel strip,			
20 g.	23 0		4.83
Cotton ties Indian speci-			
fications	15 0		3.15

*Export price. †Nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No quotations.

RUHR WORKING FOR STOCK

Steel Interests Refuse to Apply for Export Permits—Coal Imports Increase—Buying in Austria Heavy

BERLIN, GERMANY, Feb. 27.—During the past fortnight the steel market has been influenced by the recovery of the mark and the shortage caused by the French embargo against transport of Ruhr products into unoccupied Germany. The mark rose from 49,122 marks to the dollar on Jan. 31 to 18,547 marks on Feb. 16, since when it has been fairly stable at about 22,000. The Ruhr embargo has created a great demand for all iron and steel products, while the mark rise has had the usual effect of checking industrial activity, though to a less extent than after former mark recoveries. The result of the scarcity is a new move to import from Czecho-Slovakia and Austria. The Austrian Stinnes-owned Alpine-Montan corporation has

had a large number of German orders, and has been able to raise bar prices from £8 6s. to £10 per metric ton; and Germans are offering more than this price for immediate delivery.

The Ruhr iron and steel interests are largely working for stock, having refused to apply for the licenses under which with certain conditions the French will permit transport to the east. The immediate difficulty is the supply of credit and cash to the Ruhr works, without which they cannot keep on paying wages; and there has been an enormous demand from the Ruhr for money.

Steel Production Unchecked

Steel production on the Ruhr continues almost unchecked and the solution of the occupation problem, if a solution is found, will result in the letting loose of a large quantity of stocked material, with a probable increase of competition in the international steel market.

As compared with the mark exchange recovery of

over 100 per cent, prices have dropped very little. One reason is that coal prices have remained at their maximum price of about 120,000 marks a ton and heavy freight rates have to be borne on the increasing imports of foreign coal. Another reason is that when the mark recovery began, all prices were far below world-market level, having risen only threefold in January as against a rise in the foreign exchanges of nearly sevenfold. Since the mark improvement there have been two all-round price-cuts for Steel Syndicate products and two partial price cuts for pig iron. Present prices in marks per metric ton (the Steel Syndicate products being quoted as usual for Thomas) are:

Hematite	678,300
No. 1 foundry.....	648,300
No. 3 foundry.....	645,300
Siegerland steel iron.....	896,700
Spiegeleisen, 8 to 10 per cent.....	1,003,600

Siegerland and spiegeleisen have not been reduced, and are both dearer than they were on Feb. 8 when the prices of other grades of pig iron reached their maximum.

Steel Syndicate Products	Marks Per Metric Ton
Ingot	749,000
Blooms	837,000
Billets	890,000
Slabs	970,000
Structural shapes	1,034,000
Bars	1,043,000
Wire rods	1,112,000
Sheets:	
5 mm. and over.....	1,176,000
3 to 5 mm.....	1,321,000
1 to 3 mm.....	1,518,000
Under 1 mm.....	1,649,000

More Ruhr Coal Produced Than Expected

No difficulty has so far been met with by any metal producers in the fuel supply. This is partly due to the large reserves on hand, and partly to increased imports. In January coal imports sprang up to 1,870,000 metric tons as against a monthly average of 1,050,000 tons in 1922, while coal exports fell to 90,000 tons against an average of (reparations deliveries excluded) 420,000 tons. The Ruhr coal production is reported to have declined since the occupation less than was feared, but here also the output, where not consumed on the spot, is for stock.

Experts declare that if the occupation lasts indefinitely with its present conditions, the result will be a boom in German exports of machinery and other finished metal goods, reason being that payment for the necessary increased import of coal, pig iron and steel into unoccupied Germany, where most of the finishing industries lie, can only be made in that way. The confidence with which Germany faces the prospect of making heavily increased payments abroad seems fairly well justified, because the depreciation of the paper mark has never checked her ability to pay for imports.

FRENCH COKE SHORTAGE

Coke Bought in Britain, Czecho-Slovakia, Holland, and United States—Belgium Exchanges Coke for Scrap

PARIS, FRANCE, March 7.—There is unfortunately no improvement in supplies of coke to French blast furnaces. During February France received only 8000 tons of coke from the Ruhr, and 1500 tons during the first five days of March. So far the French authorities in the Ruhr have abstained from requisitioning the stocks existing at coke ovens and have simply seized strayed carloads in various parts of the coalfields.

From Dec. 20, 1922, to Jan. 20, 1923, France imported, besides German coke, 39,140 tons of coke from Great Britain, 51,900 tons from Belgium and 49,920 tons from other countries, mostly, no doubt, from Holland and Czecho-Slovakia.

Since then imports from Great Britain have no doubt increased; but, owing to the present activity of her iron and steel trade, Great Britain is now rather short of coke.

Belgium suspended all coke shipments to France for

The tendency of German exporting to turn more and more to finished goods is shown by a comparison with 1913. Experts take the optimistic view that Germany could not only adapt herself to the loss of the great ore and pig iron production of Alsace-Lorraine but could also, given time, adapt herself to the French Ruhr embargo; the result being, of course, a flooding of the world market with German finished goods, for which the technically less efficient countries would be compelled to furnish the raw materials.

Numerous Mergers of German Interests

An Interessengemeinschaft (association of interests) has been formed by the Gutehoffnungshütte, the Deutsche Werft (which is associated with the A. E. G. and Hapag) the Maschinenfabrik Augsburg-Nürnberg, and the dock constructing firm of Klitzing in Hamburg.

The two competing companies in the scrap trade, the Schrotteinkaufs Gesellschaft in Berlin, and the Sächsische Schrotthandels Gesellschaft in Dresden, have effected a merger. Several large iron and steel works in Upper Silesia and in Central Germany, including the Oberschlesische Eisenbahnbedarfs Gesellschaft, the Oberschlesische Eisenindustries Gesellschaft, the Bismarkhütte Borsigwerk, Kattowitzer Bergbau Gesellschaft, Stahlwerk Henningsdorf, Deutsch-Luxemburg, Ferrum, Ganz & Co., and the Danubius Gesellschaft, have formed the Iron Credit Co., with a capital of 500,000,000 marks, for the financing of scrap supplies of their works. They belong to the Schrotteinkaufs Gesellschaft (Scrap Buying Co.) and the two large traders in this line, Schweitzer & Oppler, Berlin, and I. Adler, Frankfurt-on-Main, are also associated.

Agreement Between Krupp and Soviet Republic

The agreement between the Soviet Government and Krupp for the cultivation of land in Southern Russia has been made public. It is very favorable to the German company, and contains privileges which have not yet been granted to any other company in Russia. The Krupp works intends to create a market for its machinery, especially agricultural, in Russia, and has formed a special company for this business. The new transaction is probably only the forerunner of more extensive deals in other lines. The company may import raw materials and industrial products free of duty, and employees up to 50 per cent of the workmen and 75 per cent of the staff may be foreigners. The company will have 105 square miles of land for thirty-six years, and pays a tax in kind of 10 per cent of the products during the first three years, of 15 per cent during the following three years and of 17.5 per cent from the seventh year onward. After expiration of the concession, the land with all the machinery, etc., becomes the property of the government. The contract runs from Dec. 1, 1923.

a time, but these are to be resumed at once, at the rate of about 30,000 tons per month, provided France delivers to Belgium one carload of scrap for each two carloads of Belgian coke.

From Czecho-Slovakia, French blast furnaces are receiving, via Austria and Switzerland, about 1200 tons of coke every other day. Some shipments are coming from Holland, where French metallurgists, through the Association Zélandaise de Carbonisation, are obtaining the output of the Sluiskil plant, the capacity of which is 300,000 tons of coke per annum.

In 1922 French collieries produced from their own ovens 1,026,000 tons of coke, of which the Nord and Pas-de-Calais districts contributed to the extent of 540,000 tons. In 1913 the respective figures were 2,635,000 and 2,445,000 tons. The reconstruction of destroyed coke ovens is being accelerated as much as possible, and the coke production of the Nord and Pas-de-Calais in January was 77,600 tons, against 65,500 tons in December. Unfortunately, this reconstruction of coke ovens must keep pace with that of the collieries, and most of the mines producing coking slacks are among those most damaged during the war.

France should now be able to produce about 1,200,000 tons of coke per annum from ovens attached to

metallurgical works, provided, however, they can obtain a sufficient supply of coking slacks.

In order simply to maintain her pig iron production of the last months of 1922, France requires 600,000 tons of coke per month, of which about 360,000 tons recently came from the Ruhr. Therefore, the gap left by the interruption of shipments from the Ruhr remains practically unfilled, and French furnaces have quite naturally been led to think of American coke as a supplementary source of supply. It is reported that negotiations are now being conducted by the Société des Cokes de Hauts-Fourneaux for the purchase of coke from the United States and that the contemplated price is \$15 to \$16, c.i.f. French ports, which is equivalent to 250 to 280 fr. As a return freight, iron ore from Lorraine (grading 32.5 per cent iron) might be available at 35 fr., f.o.b. Dunkirk.

On Feb. 23, as a result of the high prices of British coke (260 to 280 fr., c.i.f. French ports), the Société des Cokes de Hauts-Fourneaux decided, as from March 1, to increase the price from 150 fr. to 198 fr. (Franco-German frontier base), to be charged to metallurgical concerns up to 20 per cent of their capacity of coke consumption, and from 200 fr. to 310 fr. beyond the limit of 20 per cent.

On Feb. 1 there were in blast in Lorraine 25 furnaces, compared with 40 on Jan. 1, and in Meurthe-et-Moselle, 30 furnaces, compared with 47 on Jan. 1. At the end of February the number of blast furnaces still in operation in both these districts was about 40, most of which were operating at less than capacity. In January French production was 486,000 tons of pig iron and 408,000 tons of steel.

Pig Iron.—There are few transactions. The last price mentioned for chill cast foundry pig iron, No. 3 P. L., is 450 to 500 fr., at furnaces in the East, with coke at 198 fr. Some deals in French hematite were concluded at the following prices (coke at 198 fr.):

East and North, 540 to 570 fr., furnace; Parisian area, 550 to 600 fr., delivered; Center and South, 520 to 560 fr., furnaces. British East Coast hematite mixed numbers has been selling at 590 to 600 fr., delivered in the Parisian area.

Semi-Finished Material.—There is absolutely no market in basic semi-finished material. For open-hearth steel, the following prices, ex-works, are being quoted with coke at 198 fr.:

	Fr. Per Metric Ton
Ingots	580 to 620
Blooms	600 to 630
Billets	630 to 660
Sheet billets	650 to 680

Beams.—A few transactions in large beams have taken place at 720 to 750 fr. at mills, with coke at 198 fr.

Rolled Merchant Products.—Transactions in rolled merchant products are scarce. The price generally quoted is 780 to 820 fr. at mills in Meurthe-et-Moselle or Lorraine with coke at 198 fr.

Sheets and Plates.—The following prices are being quoted with coke at 198 fr. for basic steel sheets, at mills in Meurthe-et-Moselle or Lorraine:

	Fr. Per Metric Ton
Flats	780 to 820
Heavy sheets	830 to 880
Medium sheets	880 to 920
Light sheets	1,100 to 1,200

All the above-mentioned prices are subject to change with the price of coke. Sometimes, however, firm prices are quoted, among which the following are recent examples:

	Fr. Per Metric Ton at Works
Blooms (open-hearth)	700
Beams	820
Rolled merchant products	870 to 890

HEAVY EXPORT DEMAND

Numerous Inquiries Current but High Prices and Long Deliveries Are Obstacle—Large Coke Exports

NEW YORK, March 20.—Inquiry continues heavy from practically all foreign markets, particularly Japan and China, but the volume of orders received is, in comparison, considerably smaller. This condition seems attributable to rising prices and inability of exporters to promise anything like early delivery on most products. In fact on some materials, exporters are encountering great difficulty in placing orders at all. This dearth of material is particularly noticed by exporters selling to China. Chinese merchants are actively inquiring for wire shorts and second hand material of all kinds, both of which are scarce at present and when available at all are held at almost prohibitive prices. On wire, which is in considerable demand from Japanese buyers, about the best delivery obtainable is September or later, and on light gage black sheets, one large export interest is temporarily out of the market taking inventory to see how much tonnage is still available.

The increase in quotations on structural material, which has been made by the Imperial Government Steel Works, in Japan, has resulted in some inquiry here for small tonnages of structural steel. The Government steel works are now quoting 115 to 120 yen per ton for structural steel against last year's low schedule of 90 to 95 yen per ton, which was caused by the influx of German material. There would undoubtedly be heavier buying by private purchasers, were it not for the fact that Japanese bankers, fearing another deluge of imported steel as a result of overbuying at high prices, are in every possible way, trying to discourage purchases except for immediate needs, claiming that the American market has about reached a high point.

Among the numerous inquiries, upon which bids

have recently been submitted, is a tender from the South Manchuria Railway Co., for 40-miles (6914 tons) of 100-lb. rails, bids on which were opened March 20. The Ogura Oil Co., in Japan, has been receiving bids on a total of about 5000 boxes of oil can tin plate. Another rail inquiry for Manchuria is still current. It calls for about 36 miles of 25-lb. rails and was issued by the Imperial Government administration in Manchuria. In addition there are numerous smaller inquiries for rails ranging from 10 to 20 miles of medium and heavy sections. The inquiry from Otaru municipality for 30 miles of 25-lb. rails was awarded to Mitsui & Co. This export house recently was awarded about 1000 tons of gas pipe from a private source.

Demand from China is heavier than for several months. Beside wire shorts, bar ends and second hand material, there are inquiries for tin plate, galvanized sheets and pipe. There are numerous inquiries in hand for tin plate wasters. One exporter to China has recently bought a total of 100,000 ft. of small steel pipe for shipment to various Chinese branches.

Exports of American Fuel

Although importation of pig iron from Britain and the Continent has ceased, exportation of coke to France and Germany seems to have temporarily provided exporters and importers with a successful and satisfactory substitute business. One large importer and exporter in New York has sold a total of 24,500 tons of furnace and foundry coke to French and German interests in the past fortnight. Of this 15,000 tons was purchased for delivery to France and 9500 tons to Germany, the price c.i.f. either Antwerp or Hamburg ranging from \$15 to \$17.50 per ton. However, as a result of the rise in the domestic coke market and an increase in ocean freights from \$4.25 per ton to \$5.50 per ton, quotations are now several dollars higher and may prove somewhat of an obstacle to further large purchases. One exporter reports the sale of 2300 tons of spiegeleisen to Belgium to fill orders left open through cancellation by German producers since the occupation of the Ruhr.

Exporters who look forward to the possibility of selling American pig iron in foreign markets feel that such an opportunity will present itself only when British furnaces are so heavily booked with orders as to be out of the market, or the British price has increased several dollars higher than at present.

C. P. Sandberg, 143 Liberty Street, New York, consulting and inspecting engineer for the Department of State Railways, Bangkok, Siam, is receiving bids on about 10,000 old steel standard gage sleepers, which the Siam State railroad is offering for sale. The dimensions are 7 ft. 7½ in. x 9½ in. x ¾ in., and the weight 128 lb. each, or about 570 tons in all.

Machinery for generating electricity to light 10 towns in and near Antung, China, is being inquired for by a Chinese company, which is understood to have an order to install these plants, says a recent consular report to the Bureau of Foreign and Domestic Commerce. The capacities required range from 11 to 110 kw., or sufficient to supply 700 to 5,000 16-candle-power lights. Full particulars are available at offices of the bureau.

BRITISH MOVEMENTS

Market Strong and Prices High—Less Coke Used Last Year—Shipping Position Easier

LONDON, ENGLAND, March 8.—During the past fortnight the strength of the iron and steel market has continued and the tendency in all directions has been toward higher prices. The Continental demand both for coke and pig iron is still heavy and, with the price of the former now up to 42s. (\$9.87) delivered to local consumers, the chances of any substantial increase in the output of pig iron are remote. Additions have been made, two furnaces being restarted in the Cleveland district, and some on the West Coast, but these will not relieve the market, as the products are all required for consumption in steel works. Cleveland makers are sold out for two months ahead, and for deliveries beyond that date will not quote at present.

No. 3 Cleveland foundry iron has been sold at 125s. (\$29.37) and as much as 140s. (\$32.90) has been paid for special grades of East Coast hematite. Scotch pig iron has been sold in fair quantities to Canada, for shipment on the reopening of navigation.

In reply to a question asked in the House of Commons this week, the number of coke ovens in use in the United Kingdom last year was estimated at 10,500 and the quantity of coke produced at 9,400,000 tons, which compares with 15,400 ovens and 12,611,435 tons in 1920, and 21,006 ovens and 12,798,996 tons in 1913. The amount of coke consumed in blast furnaces last year was about 6,000,000 tons, compared with 5,750,000 tons in 1920 and 11,750,000 tons in 1913.

The increase in the costs of production is reflected in manufactured iron and steel prices which are about 10s. (\$2.35) dearer than those quoted two weeks ago. In some cases works have booked enough orders and now cannot deliver under 10 to 12 weeks for certain specifications, some very good buying having been done by domestic consumers. Sir W. G. Armstrong, Whitworth & Co. has recently secured orders for 37 heavy locomotives for India, and the total number of locomotives for India placed in this country, according to Parliamentary returns, is now 75 for the Indian Government lines, and 206 for companies' lines.

Reports from the Continent continue to show the position daily becoming worse and, while here and there quotations are made, generally speaking it is very difficult to do business. Small consignments against some current contracts are being made as long as fuel supplies last, but it is doubtful whether such orders will be completed. The buyers on this side are naturally pressing for deliveries, especially of semi-finished steel, which is in very short supply both here and on the Continent.

The cheaper freights now ruling are hardly encouraging to the shipbuilding trade. Inquiries for new

Removal of old locks and construction of new ones higher up the branch of the Brantas River, which flows through Soerabaya, Java, Dutch East Indies, are contemplated in plans recently submitted to the Department of Public Works in Soerabaya. The work is expected to involve 2,000,000 to 3,000,000 guilders.

It is reported from Buenos Aires, Argentina, to the Bureau of Foreign and Domestic Commerce, that the National Bureau of Public Works contemplates the expenditure of 38,763,763 paper pesos (about \$16,459,094 at par) for this year's construction program. In addition, it is reported that about \$12,140,604 will be expended during the year for the modification and extension of sanitary works in different parts of the Republic.

In Spain, the Government will receive bids during the coming six months for the construction of a meter-gage railroad from Gama on the Santander-Bilbao line to the port of Santana, in Santander Province, about 10 kilometers (6.2 miles). Further information may be obtained from the Bureau of Foreign and Domestic Commerce.

ships come in, it is true, and some good orders have been booked but, generally speaking, ship-owners are not keen to commit themselves. Consequently steel plate makers lack orders, and can give fairly prompt deliveries, whereas sectional steel is scarce, and this accounts for the fact that the two products are quoted at practically the same price. Swan, Hunter & Wiggin Richardson are reported to have purchased a substantial tract of land on the Tees side for the purpose of establishing a shipyard there.

In the fifty-second yearly report of the North of England Steam Ship Owners' Association it is stated that, while primary shipping costs have undergone no material decrease, a general reduction in dock and harbor dues and in railroad rates, as well as reduced costs affecting steel and iron trades, have assisted in making the position of shipping somewhat easier, while the phenomenal demand for coal, both from America and the Continent, meant more employment for shipping and, though the number of steamers lying idle is still large, a considerable reduction has been made.

British Pig Iron and Steel Output in February

LONDON, ENGLAND, March 17. (By Cable).—The production of pig iron in Great Britain in February was 543,400 gross tons and that of steel ingots and castings 707,100 tons. These compare with 567,900 tons of pig iron and 634,100 tons of steel in January. The February steel output is the largest since December, 1920, when it was 746,600 tons. The 1922 production averaged 408,300 tons of pig iron per month and 486,000 tons of steel ingots and castings per month.

The comparative data for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month.....	855,000	629,000
1920, per month.....	669,500	755,600
1921, per month.....	217,600	302,100
1922, per month.....	408,300	486,000
1923, January.....	567,900	624,300
1923, February.....	543,400	707,100

WASHINGTON, March 20.—At the end of February 189 blast furnaces were in operation in Great Britain and 340 open-hearth furnaces. Six blast furnaces and 20 open-hearth furnaces had been lighted in the month.

The February iron and steel exports, given in THE IRON AGE's cable dispatch from London, on page 792 of last week's issue, include besides the 65,881 gross tons of pig iron there mentioned, 14,098 tons of ferroalloys, 46,690 tons of tin plate, 49,690 tons of galvanized sheets and 29,694 tons of plates and sheets.

Imports totaled 122,664 tons, of which 45,383 tons were semi-finished steel material and 15,711 tons pig iron and ferroalloys.

Report on Business Cycles Anticipated

Indications of What Recommendations Will Be—Some Government Work Postponed—Similar Action as to Other Projects Probable

WASHINGTON, March 20.—Because of the present-day conditions it is considered to be extremely timely that the Committee on the Business Cycle of the President's Unemployment Conference will make its report in about a week. It already has been stated by Secretary of Commerce Hoover that one of the outstanding suggestions in this report will be for development by financial and business interests, as well as by Government departments, of improved statistical studies, looking to more intelligent control of the business cycle in order to avoid periods of booms and slumps.

It will not be the purpose of the committee in any way to tell any of these interests how to run their business, but it is the intention to lay before them facts and figures based on a careful and intensive survey during the past 18 months by 250 people so that there will be made possible a clear conception of the ups and downs in the business world and their causes and effects. In a word, it is the hope that conditions may be planned out and put on an even keel so as to do away as nearly as possible with peaks and valleys and to move out on a more nearly even road of industrial activity and prices. There is no expectation that this ideal can be wholly realized, but it is felt that the study will be of great educational value and of vast economic help to the country.

It also will be recommended by the committee that there be control of public expenditures in construction work by deferring such undertaking wherever possible when it is proceeding at its highest point. Likewise private lines engaged in construction work will also be told of the advantage in spreading activities of this kind over extended periods rather than intensifying such efforts within a limited space of time. It is believed that the iron and steel industry, for instance, would be greatly helped if such a program were made effective. The committee is considered by Secretary Hoover to be possessed of extraordinary ability and is headed by Owen Young, president of the General Electric Co. Other members are Joseph H. Defrees, former president of the Chamber of Commerce of the United States; Clarence Woolley, president of the American Radiator Co.; Catherine VanFleet and Matthew Woll, the last-named being associated with the American Federation of Labor.

Recommendations Indicated

Considerable significance is attached to the fact that precedent to the announcement of the Committee on the Business Cycle, Secretary Hoover made public yesterday morning a report to the President which plainly anticipates recommendations that are to be made by the committee. The report to the President was made at the request of the latter. The President pointed out that the Administration in one way or another has the direction of Congress to carry on a considerable volume of construction work and the Chief Executive sought "the advice of the Department of Commerce as to the policy which ought to be pursued in view of the present economic situation in the building industries, with a view to determining how much to speed up on the construction program to which we are committed."

Secretary Hoover, in brief, urged that in view of the present activities and full employment in the construction and related industries, the Government defer its program as a sort of a reserve when there is less activity. This is in line with the suggestions made by the President's Unemployment Conference in 1921. Secretary Hoover also pointed to the present high index figures applying to structural steel and other commodities at present as compared with those of other

years, such as 1913 and 1916, as a further reason for postponing Government work. It is evident that the Administration is attempting to set a pace as a caution against inflation with its inevitable period of liquidation and unemployment and also is endeavoring to straighten out the sharp curves, as to prices and employment, that accompany fluctuating industrial conditions.

Secretary Hoover's Position

Secretary Hoover in his reply to the President pointed out that a survey conducted by the department developed the following fundamentals:

"1. The year 1922 was a year of very large employment and activity in the construction trades and at the end of the year stocks of construction materials were very much reduced. Since the beginning of the present year, there has been even more activity than in the same period last year and the contracts let in the past few months are of larger volume than any hitherto entered into in a similar period. Advance orders for construction materials are upon a very large scale.

"2. Labor in the construction trades and in the manufacture of material is not only at full employment but there is actually a shortage in many directions.

"3. Transportation facilities available for the building materials are fully loaded and almost constant car shortages are complained of with consequent interruption in production.

"My conclusion from all this is that, at least for the next several months, the trades will be fully occupied in private construction, all of which is generally needed by the country," said Mr. Hoover.

"For the Government to enter into competition at the present moment will give no additional employment to labor and no additional production of materials but must in the broad sense in the end displace that much private construction. The governments, nationally and locally, are in a much better position to hold construction work in abeyance than are private concerns, and are in better position to speed up in times of less demand as we did in the last depression as the result of the Unemployment Conference. We can by this means contribute something to a more even flow of employment not only directly in the construction work but in the material trades.

"I would recommend, therefore, that you direct the different divisions of the Government to initiate no new work that is not eminently necessary to carry on the immediate functions of the Government and that there should be a slowing down of work in progress so much as comports with real economy in construction, until after there is a relaxation in private demands."

Sales of Steel and Other Products

In a statistical study accompanying the report, Secretary Hoover shows among other things, that fabricated steel sales in 1922 were 68 per cent over those of 1913 and were 16 per cent over those for 1916, the highest previous year. Lumber production in 1922, he pointed out, was above any year in the past decade. Cement shipments were greater than production and were 20 per cent higher than in 1920, the previous record year. Actual building activity in 1922, Mr. Hoover pointed out, in relation to 1919, was greater than the figures on contracts awarded show. A large amount of building contracted for in the last months of 1921 was carried over into 1922, the report pointed out, while there was practically no such carry-over into 1919.

Dealing with price levels, the report shows that

there was an increase of 17 per cent in February, 1923, over February, 1922, in frame house materials, an increase of 16 per cent in brick house materials, and an increase of 23 per cent in wholesale prices.

"The limiting physical factors in the amount of construction to be undertaken in the future are labor, materials, and transportation.

"It may be said generally that labor is in full employment at the present time, and the increase in construction demand during the spring months on the basis of contracts already let indicates even increased shortages over those now existing. Considerable numbers of material manufacturers are running at full capacity, and where production capacity is underemployed at the present time, it is largely due to shortage of labor.

"Advance orders are greatly in excess of those a year ago. Combined figures of seven large lumber associations show an increase of 49 per cent in orders received during the first nine weeks in the year, over the same period in 1922. Unfilled steel orders of the largest company were 71 per cent greater at the end of February than a year before. Sales of fabricated steel for the first two months of 1923 were 85 per cent above the same period in 1922. January orders for sanitary pottery made a new high record for all time. Trade reports for other commodities not covered by adequate statistics indicate similar tendencies.

"The transportation situation is indicated by the car shortage during the last few months as follows:

Car Shortage at End of Month			
	1922	1921	
December	82,927	110	
	1923	1922	
January	73,269	642	
February	80,633	599	

"From the above it would appear that the building and construction necessities of the country are being taken care of so far as labor, material manufacturing, and transportation facilities permit, and that the addition of Governmental projects at the present time will not add to the production of materials or to the amount of employment in the country, but would in fact mean simply displacement of construction that could be undertaken at private hands."

Building Deferred

The Federal Reserve Board already has inaugurated the program of deferring building activities, as suggested in the Hoover recommendations. It has disapproved of acceptance of bids for the building of a branch bank at Little Rock, Ark., the bids having been received by the Federal Reserve Bank at St. Louis. The board adopted a resolution yesterday stating that until "the present congestion in the building activities of the country is materially relieved and costs of building are lowered, the Federal Reserve banks should not add to the existing difficulties of the situation by carrying on any branch building operations other than those now in progress or for which contracts have already been entered into."

The Obermayer Prize for Foundrymen

The Rochester convention of the American Foundrymen's Association in 1922 was marked by the first Obermayer prize competition. Provision is being made for a similar contest this year at the Cleveland convention, April 30 to May 3. This prize, which is given by the S. Obermayer Co., will be bestowed upon the person submitting a drawing or a model of some jig or device which in the opinion of the judges embodies the best ideas for a device to help in the economical production of castings. The conditions call for a device which can be constructed in any foundry and used in the production of castings and other foundry operations, but which shall not be patentable. Contestants for this prize will be limited to men who are foremen or workers in foundries or in some department of a plant operated in connection with a foundry. They should file notice with the secretary of the association, C. E. Hoyt, 140 South Dearborn Street, Chicago, of their desire to enter the contest.

MAY CHANGE TARIFF

Fordney-McCumber Rate on Pig Iron to Be Investigated by Commission

WASHINGTON, March 20.—Differences between foreign and domestic costs of production of pig iron will be the subject of an investigation by the United States Tariff Commission under the flexible provisions of the Fordney-McCumber act. The only other products in the metal schedule listed in the 17 investigations ordered by the commission, under these provisions, embraced within section 315, are Swiss pattern files.

Pig iron carries a duty of 75c. per ton under the present law, as compared with \$2.50 under the Payne-Aldrich act, while under the Underwood-Simmons law it was free of duty. Files under the present law take duties ranging from 25c. to 77½c. per dozen, being identical with those carried in the Payne-Aldrich act, and under the Underwood-Simmons law were dutiable at 25 per cent. It is the policy of the commission not to announce either the names of those making application for changes in rates under the flexible provisions or to denote whether they sought an increase or decrease in the duties. In view of past reports, however, it is understood that the application regarding pig iron rates was filed by American merchant blast furnace interests, seeking to increase the duty to the maximum allowed under the law or 50 per cent, which would bring it to \$1.125 per ton.

President Harding's Action

Announcement of the investigations, made this morning, was not made by the commission until after appeal had been telegraphed to President Harding in Florida to break the deadlock within the commission regarding the policy it is to pursue under the flexible provisions. The President telegraphed to Chairman Thomas O. Marvin of the commission advising him to proceed with the investigation and to send out notices which had been mailed to the press last Saturday, but which had been held up at the post office upon an order from the White House pending communication with the President after the differences of opinion within the commission became known. As pointed out in THE IRON AGE of Feb. 8, page 407, there are two schools of thought regarding authority conferred in enacting the flexible provisions. One group represented by Vice Chairman William S. Culbertson of the commission, a Republican, is of the opinion that Congress intended that the commission through the President was authorized to bring about a complete and so-called scientific revision of the tariff. The other group, headed by Chairman Marvin, also a Republican, is strongly of the opinion that Congress did not bestow such widespread authority upon the President and the commission, but that it intended changes in rates should be based upon economic conditions as they affected foreign and domestic costs of production and as they change from time to time. It is considered that the President has accepted the interpretation of the Marvin group and does not intend that the commission of its own volition shall inaugurate wholesale investigations so as to bring about a complete revision of the tariff.

It also is accepted as a matter of course that the constitutionality of the flexible provisions will be challenged, now that the investigations actually have been ordered, and those questioning the constitutionality will have specific cases under which they can proceed.

In its announcement the commission said that it had received upward of 140 applications for relief under the flexible provisions. It is understood that it had tentatively granted 30 of these applications, but subsequently pared them down to 17, most of the latter including items in the chemical and cotton schedules. Under the commission's rules of procedure formal notice of the investigation into each article will be published and opportunities afforded to all persons interested to appear, present evidence and be heard in person or by a representative. It is stated that applications relative to other articles are still pending.

Iron and Steel Markets

FURTHER ADVANCES

Higher Wages As a Market Factor

Special Urgency in Automobile Steel—Building and Car Demand Heavy

There is a lessened rate of new bookings by steel mills, due chiefly to the fact that most producers will not sell farther ahead in the face of higher costs, under the general expectation of wage increases to iron and steel workers. However, in spite of circumstantial reports, no such announcements have been made.

The ability of leading works to make a further slight increase in output the past week has strengthened the belief that all the steel required will be produced. There is also the probability that outdoor work will draw as many men from plants consuming steel as from those making it.

On their face all the week's price developments indicate a stronger market situation. Some of the advances, notably in sheets, are due to the effort of the automotive industry to get hold of more steel within a given time than the mills can deliver, especially in view of recent plant additions at Detroit. The Ford program for March is 156,000 cars and the average for Detroit plants is 12,000 a day.

On the heavier products—plates, shapes and bars—there are wider variations this week in the prices of various mills and the deliveries they can make, but 2.50c. material and higher is still in the premium class, with the contract basis for third quarter largely undetermined. Plates in particular show high prices for early delivery, eastern mills asking as much as 2.90c.

Blue-annealed sheets are in notably short supply. Mills that can deliver quickly are getting 3.25c. Galvanized sheets also are distinctly higher. There is a sharp advance also in tin plates, as high as \$6 being paid for a round lot.

In the Central West current demand for sheet bars is quite in excess of available supply, pending inquiries including one for 10,000 tons. After making further sales at \$45, Youngstown, an important producer has withdrawn from the market.

Cleveland reports this week, as did Chicago last week, that some construction is being postponed because of high costs, but at Detroit, where wage advances have been less, building is not affected as yet.

A total of over 40,000 tons of new fabricated steel inquiries, not including 10,000 tons for oil tanks for the Navy at Honolulu, shows sustained activity, and 26,000 tons was awarded for 20 of the larger jobs. The New York Central, the Chesapeake & Ohio and the Seaboard bought a total of 8000 cars and the Louisville & Nashville entered the market for 8000. Eastern car plants are not so heavily booked as those of the West.

Pig iron buying, while perhaps not so brisk as in the preceding week, has been active and prices have again advanced \$1 in the principal Northern centers and Virginia, while in Alabama \$27, Birmingham, continues to be the prevailing price. Purchases include 20,000 tons of Southern for third quarter for a sanitary company and 10,000 tons for an Indiana automobile company, of which 4000 tons will come from Canada and 6000 from Buffalo. Virginia iron is selling over a much wider territory than in several years and is an important factor in the Chicago market. Ohio and Buffalo irons are selling freely in Michigan and Indiana. The basic market in Cleveland and Pittsburgh shows decidedly increased interest of melters. Charcoal grades have been marked up from \$1.50 to \$2. Indications are that pig iron production will be sharply increased at an early date, provided requirements for coke can be met.

France and Germany have agreed to waive export licenses on 120,000 tons of steel from the Ruhr on British shipbuilding contracts. Another new development is the starting up of plants in Czechoslovakia to supply steel to Germany.

Sales of domestic coke for export to France, Belgium and Germany are now estimated at 100,000 tons. Already there is car congestion at the eastern seaboard due to shipments on these orders.

Since placing rails with Germany in 1922 at bargain prices for 110 miles of South Manchurian Railway extensions, Japan has failed to get deliveries. Already rails for 30 miles of this track have been bought in this country for early delivery, and now further inquiry has come for 6900 tons or 40 miles.

Higher prices for pig iron are reflected in THE IRON AGE composite figure, which is \$30.86 against \$29.96 last week, \$27.38 last month, and \$18.38 one year ago.

Finished steel remained at 2.710c. per lb., according to THE IRON AGE composite price. This compares with 2.446c. Jan. 2.

Pittsburgh

Buyers Urge Deliveries—Less Fear of Shortage of Labor

PITTSBURGH, March 20.—The steel situation here has lost none of its recent strength, and if there has been any decline in activity it is because the mills do not want to add to their obligations in the face of an early possibility of still higher costs in the shape of wage increases. Buyers are just as eager for supplies and places on new order books as they have been. They are particularly anxious for deliveries against tonnages under order or contract to safeguard secondary manufacturing schedules, and there are instances where buyers are tracing cars to insure delivery. It is claimed that virtually all of the steel moving away from the mills is going into consumption and that there is almost no stocking.

In view of the fact that steel plant and furnace

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Mar. 20, 1923	Mar. 13, 1923	Feb. 20, 1923	Mar. 21, 1922
No. 2X, Philadelphia...	\$33.14	\$31.76	\$29.76	\$21.26
No. 2, Valley furnace...	31.00	30.00	28.00	19.00
No. 2, Southern, Cin'tif...	31.05	31.05	29.05	19.50
No. 2, Birmingham, Ala.†...	27.00	27.00	25.00	15.00
No. 2 foundry, Chicago*	32.00	31.00	30.00	20.00
Basic, del'd, eastern Pa...	30.00	29.50	28.25	20.50
Basic, Valley furnace...	31.00	30.00	26.50	18.00
Valley Bessemer, del. P'gh	32.77	31.77	29.77	21.46
Malleable, Chicago*	32.00	31.00	30.00	20.00
Malleable, Valley	31.00	30.00	28.00	19.00
Gray forge, Pittsburgh...	32.27	31.27	29.27	20.71
L. S. charcoal, Chicago...	36.15	34.65	33.15	26.00
Perronmanganese, furnace...	120.00	120.00	107.50	62.50

Rails, Billets, Etc., Per Gross Ton:	Mar. 20, 1923	Mar. 13, 1923	Feb. 20, 1923	Mar. 21, 1922
O.-h. rails, heavy, at mill...	\$43.00	\$43.00	\$43.00	\$40.00
Bess. billets, Pittsburgh...	45.00	45.00	40.00	28.00
O.-h. billets, Pittsburgh...	45.00	45.00	40.00	28.00
O.-h. sheet bars, P'gh...	45.00	45.00	40.00	29.00
Forging billets, base, P'gh	52.00	52.00	47.50	32.00
O.-h. billets, Phila...	50.17	48.67	45.17	33.74
Wire rods, Pittsburgh...	50.00	50.00	50.00	36.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb...	2.35	2.35	2.25	1.40
Light rails at mill...	2.25	2.15	2.15	1.40

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.825	2.725	2.475	1.76
Iron bars, Chicago...	2.50	2.50	2.50	1.60
Steel bars, Pittsburgh...	2.35	2.35	2.25	1.40
Steel bars, Chicago...	2.35	2.35	2.25	1.60
Steel bars, New York...	2.69	2.69	2.59	1.78
Tank plates, Pittsburgh...	2.35	2.35	2.25	1.40
Tank plates, Chicago...	2.50	2.50	2.35	1.60
Tank plates, New York...	2.69	2.69	2.59	1.78
Beams, Pittsburgh...	2.35	2.35	2.25	1.40
Beams, Chicago...	2.45	2.45	2.35	1.60
Beams, New York...	2.69	2.69	2.59	1.78
Steel hoops, Pittsburgh...	3.30	3.05	2.90	1.80

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Mar. 20, 1923	Mar. 13, 1923	Feb. 20, 1923	Mar. 21, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.50	3.00
Sheets, galv., No. 28, P'gh	5.00	4.85	4.60	4.00
Sheets, blue an't'd, 9 & 10	3.00	2.90	2.65	2.25
Wire nails, Pittsburgh...	2.80	2.80	2.80	2.40
Plain wire, Pittsburgh...	2.65	2.65	2.65	2.25
Barbed wire, galv. P'gh...	3.45	3.45	3.45	3.05
Tin plate, 100-lb. box, P'gh	45.50	44.95	44.75	44.60

Old Material, Per Gross Ton:

Carwheels, Chicago...	\$28.50	\$28.50	\$27.50	\$17.00
Carwheels, Philadelphia...	27.00	26.00	25.00	16.00
Heavy steel scrap, P'gh...	26.50	24.00	23.50	15.00
Heavy steel scrap, Phila...	26.00	25.00	21.00	13.50
Heavy steel scrap, Ch'go...	24.00	24.00	20.00	12.50
No. 1 cast, Pittsburgh...	28.00	26.00	25.00	15.75
No. 1 cast, Philadelphia...	29.00	28.00	24.00	17.25
No. 1 cast, Ch'go (net ton)	27.00	26.00	24.00	14.25
No. 1 RR. wrot., Phila...	28.00	27.00	25.00	15.50
No. 1 RR. wrot., Ch'go (net)	21.00	21.00	18.00	11.75

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt...	\$7.50	\$7.50	\$7.00	\$3.25
Foundry coke, prompt...	8.50	8.25	8.00	4.25

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	17.25	17.12½	16.00	13.00
Electrolytic copper, refinery	17.00	16.75	15.75	12.75
Zinc, St. Louis...	8.00	7.80	7.30	4.72½
Zinc, New York...	8.35	8.15	7.65	5.07½
Lead, St. Louis...	8.25	8.25	8.10	4.42½
Lead, New York...	8.25	8.60	8.15	4.70
Tin (Straits), New York...	49.25	51.50	42.62½	29.12½
Antimony (Asiatic), N. Y.	8.75	8.87½	7.12½	4.20

Composite Price, March 20, 1923, Finished Steel, 2.710 Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	March 13, 1923, 2.710c. Feb. 20, 1923, 2.681c. March 21, 1922, 2.019c. 10-year pre-war average, 1.689c.
These products constitute 88 per cent of the United States output of finished steel	

Composite Price, March 20, 1923, Pig Iron, \$30.86 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	March 13, 1923, \$29.96 Feb. 20, 1923, 27.38 March 21, 1922, 18.38 10-year pre-war average, 15.72
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operations are holding up at a remarkably high rate in the face of oft-repeated assertions that labor is scarce, there is some tendency to discount reports of labor shortages and this is accompanied by a growing belief that the country will be able to produce all the iron and steel that will be required. The automotive industry, however, wants supplies in greater volume at one time than can be physically provided, and it stands out strikingly that those lines finding heaviest use by that industry are the ones where premium prices are most common. It is reported that a northern Ohio maker of automobile sheets is in position to deliver promptly and has obtained as much as 7c. base for body stock. Hot-rolled flats are another very strong line, and the demand for the automotive industries is largely responsible. The general market on finished products is tending higher because semi-finished steel has advanced so much more than finished lines. Sharply higher prices have been reached for tin plate for early delivery since a week ago. Few mills have any surplus tonnages available for delivery during the current half year, and we note sales of selected stock items at \$6 per base box and one sale of a round lot of production plate at the same figure.

The week has been marked by a further advance of \$1 per ton in all grades of pig iron, and scrap prices have stiffened sharply, chiefly because of a big sale at

Massillon, at prices that enhance the value of local yard holdings and also serve to check any increased offerings in this market.

Coke prices remain firm under the influence of export demands, coupled with the fact that so much of the Connellsville production was under contract when this demand developed. The coal market, strangely enough, is not affected in the least by the export situation or the relatively high prices for coke.

Steel works operations in the district hold at about 85 to 90 per cent by the independents and the Steel Corporation average is right around the higher figure. Dover furnace of the Hanna Furnace Co. went out today for minor repairs, and will be down for ten days or two weeks, and the furnace of the Struthers Furnace Co. is expected to go down shortly for an important repair. Otherwise, there has been no change in the blast furnace list in this district.

Pig Iron.—Prices continue to creep higher since demands exceed offerings. We note one sale of approximately 7500 tons of basic for second quarter delivery at \$31, Valley furnace base, and apparently none is available for less. Follansbee Brothers Co. is in the market for 10,000 tons for delivery over the four months beginning with June, but has not had much of a response from producers who hesitate to sell that far ahead until they have more definite knowledge as to

costs. Bessemer iron also has sold at \$31, Valley furnace, and also at \$31 at Johnstown, Pa. About 3000 tons of this grade has been sold. No. 2 foundry iron also commands \$31 and evidently we are in the market where iron is iron, since \$31 also has been paid for malleable grade.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.77 per gross ton:

Basic	\$31.00
Bessemer	31.00
Gray forge	\$29.50 to 30.50
No. 2 foundry	31.00
No. 3 foundry	30.50
Malleable	31.00
Low phosphorus, copper free.....	35.00 to 36.00

Ferroalloys.—The market here shows all around strength, notably for early supplies of ferromanganese. Domestic producers are asking \$120, furnace or seaboard, for such small lots as they have available for delivery between now and July 1, while the price of British material for such delivery is \$125, seaboard. If there is any of the latter for early delivery, it is tonnage in second hands. On last half tonnages, both domestic and British producers are naming \$115, furnace and seaboard. Spiegeleisen again is being sought, with the biggest demand from those who hitherto have used ferromanganese. There is only one source of supply and this factor has no tonnage available for delivery during the current half year. Prices have advanced to \$39 to \$40, furnace, for 19 to 21 per cent material, with 16 to 19 per cent alloy quoted \$1 per ton less. Shortage of 50 per cent ferrosilicon still is acute and \$92.50 delivered now seems to be minimum.

We quote British 80 per cent ferromanganese, \$115 to \$125, c.i.f. Atlantic seaboard, duty paid, changes in the duty for buyers' account, or \$119.79 to \$129.79 delivered Pittsburgh; domestic, \$119.79 to \$124.79 f.o.b. furnace, freight allowed; 50 per cent ferrosilicon, \$92.50; spiegeleisen, 19 to 21 per cent, carloads, \$39 to \$40, furnace; 16 to 19 per cent, carloads, \$38 to \$39, furnace. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$47.50; 11 per cent, \$50.80; 12 per cent, \$54.10; 13 per cent, \$58.10; 14 per cent, \$63.10; silvery iron, 6 per cent, \$36; 7 per cent, \$37; 8 per cent, \$38.50; 9 per cent, \$40.50; 10 per cent, \$42.50; 11 per cent, \$45.80; 12 per cent, \$49.10. The present freight rate from Jackson and New Straitsville into the Pittsburgh district is \$3.66 per gross ton.

Iron and Steel Bars.—The Steel Corporation and the leading local independent still hold to a base of 2.25c., Pittsburgh, but both are heavily obligated and are taking on very little new business. Valley mills nominally are at 2.25c., base, but have no surplus over their present commitments. Pressure for shipments against orders is heavy and insistent and it is claimed that there is no stocking among manufacturing consumers, while warehouse interests are moving consignments so freely as to be unable to build up stocks. It is doubtful if mills will accept less than 2.35c. on reasonably early deliveries while the more common price on specified shipments is 2.50c. base. Iron bars are firm at unchanged prices.

We quote steel bars rolled from billets at 2.25c. to 2.50c.; reinforcing bars, rolled from billets, 2.25c. to 2.50c. base; rail steel reinforcing bars, 2.20c. to 2.30c.; refined iron bars, 3c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—The regular market price is crystallizing at 2.35c., Pittsburgh, that now being the quotation of both the Steel Corporation and the leading independent here for second quarter. Mills have given protection on some tonnage to the end of this month at 2.25c., and it is said that the average price of current shipments still is below 2c. All mills are heavily committed and are not easily interested in strictly new business. Postponement of some important projects in other parts of the country is not disturbing to fabricators here, with the Government report on structural awards showing a gain of almost 8500 tons over January and new inquiry still showing much activity. Plain material prices are given on page 859.

Plates.—The minimum price now is 2.35c. base, Pittsburgh, except against a few tonnages on which the mills have protected buyers to the end of this month at 2.25c. The Jones & Laughlin Steel Corporation has named 2.35c. as its base on such second quarter business as it can take and the Steel Corporation is also at that figure, though not a free seller, since it has little open capacity for the remainder of the pres-

ent half year. Other mills generally are quoting 2.50c. and a Cleveland producer has made sales as high as 2.75c. About 700 tons of steel, mostly plates, will be required for five 1000-ton steel coal barges recently taken by the American Bridge Co. Prices are given on page 859.

Sheets.—Pressure for supplies still is heavy and the market continues to work higher under the insistence of buyers for sufficient material to keep up their operating schedules. All consuming industries are busy, notably the automotive industry, with Detroit district plants reported to be turning out 12,000 vehicles a day. Shipments of steel on contracts are not sufficient to permit such a showing and active buying of additional tonnages is noted. This is reflected in high prices for specified deliveries of sheets finding heavy use in automobile construction. As high as 7c. base on automobile body sheets has been obtained by a northern Ohio maker and blue annealed sheets for disk wheels have lately sold up to 3.25c., base. The leading interest is sold out for the present half year and is able to make progress against its obligations by declining new business. A high ratio to the total booking is already specified. An Ohio independent has just announced a base of 5.25c. on galvanized sheets and 5c. now is the minimum on this grade, while on black sheets 3.75c. is as low as early delivery material can be placed and 3c. base measures the bottom of the going market on blue annealed sheets. Prices are given on page 859.

Tin Plate.—Mills are so heavily committed for the present half year that they cannot take on additional tonnages without the danger of carrying some of it into third quarter and it is very difficult for those who must have additional tonnages to secure them. There is a demand for early tonnages and inability to obtain standard plate has prompted active buying of stock items, which have sold anywhere from \$5 to \$6 per base box, the higher figure for a selection. We also note a sale of 5000 boxes of standard plate at \$6 and it is believed that there is not a mill in the country today which would consider less than \$5.50 for production plate. Third quarter prices will not be announced for some time yet, but in view of high prices for sheet bars and pig tin, the expectation now is that the price for that product will be up around \$6 per base box, Pittsburgh. The leading interest is sold through the present half of the year and probably will have to carry some business over into third quarter.

Bolts, Nuts and Rivets.—The situation in these products shows no special change except that a leading producer of rivets has opened books for second quarter business, naming prices of \$3.25 to \$3.50 base, per 100 lb. for large structural and ship rivets, \$3.35 to \$3.60 for boiler rivets and 60 and 10 to 60 and 5 off list for small rivets, the lower figures applying on large tonnages. It is reported that there has been a fairly good response at these prices. Prices and discounts are given on page 859.

Track Fastenings.—The Norfolk & Western Railway is in the market for 50,000 tie plates. General demand for track equipment is good, despite the fact that the railroads placed heavy orders last fall and still have much material due them. Prices are unchanged but firm since crude steel prices are relatively higher than those of finished products. Prices are given on page 859.

Coke and Coal.—Export demands for furnace coke still are fairly numerous and are absorbing a good deal of the surplus production over that already contracted for. Sales for export have been made in the past week at prices anywhere from \$7.25 to \$7.75, but most of the transactions, which total so far approximately 100,000 tons, have been at \$7.25 to \$7.50. Standard furnace coke for domestic sale has advanced about 25c. further, now being quotable at \$7.50 per net ton at ovens. Higher prices are being asked, but rarely obtained on domestic business and there are intimations that operators served by the Pittsburgh & Lake Erie Railroad, which is embargoed on export business, would take \$7.25. It must be said that there is not much enthusiasm for export business, and buyers with-

out financial standing find it difficult to interest producers. There is a feeling that export business will not continue long since the shaking up that cargoes would get on the ocean would spoil the structure. Foundry coke for prompt delivery is rather scarce and \$8.50 per net ton at oven, up 25c. per ton from last week, now is minimum, while as high as \$9 has been paid. The coal market is really weak. Steam coal, mine run grade, now does not bring over \$2.50 per net ton at mines and sales are being made as low as \$2. Mine run coking and gas coal for spot delivery is as low as \$2.85 and on contract the market ranges from \$3 to \$3.25, with \$3.50 being occasionally obtained.

Steel Rails.—Makers of light rails are uniformly quoting 2.25c. base, mill. This price, representing an advance of \$2 per ton, is more of an adjustment of the price to costs since the demand is extremely moderate. Re-rolled rails also are held at 2.25c. base. There has been no change in standard rail prices, but it is figured that, in view of the \$10 increase in the price of billets since present prices were named, the price of standard rails should advance to at least \$50.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2.25c. base; standard rails, \$43 per gross ton mill for Bessemer and open-hearth sections.

Tubular Goods.—Few mills have escaped becoming sold up at least 90 days and their effort now is to prevent further increases in their obligations. Acceptance of new business is strictly on the basis of average allotments to the individual customer, and oil country and line pipe business is being accepted only on a basis of delivery at convenience of the mills, and then at prices in effect at time of shipment. Inability of leading makers to make definite promise of delivery has led the Texas Co. to shelve its recent inquiry for 400 miles of 6 to 16 in. line pipe for the Southwest. Producers of wrought iron pipe are 60 to 90 days behind their orders. One producer has withdrawn prices on most sizes and is quoting only upon application. Early shipments of boiler tubes are still very hard to obtain. Discounts are given on page 859.

Semi-Finished Steel.—The market has become more fully established at \$45 for billets, sheet bars and slabs, although a Valley producer is said to have allotted second quarter tonnages of sheet bars to regular customers at \$42.50, Youngstown, and a western Pennsylvania producer recently took 6000 tons for second quarter delivery at the latter figure. In this case, however, the sale represented the exercising of an option given several weeks ago. Some makers are trying to re-establish their extras of \$1 to \$2 per ton over the base size for small billets. Wire rods are scarce and not obtainable for early delivery below \$50 for the base sizes. On skelp 2.35c. is absolutely minimum. Prices are given on page 859.

Wire Products.—Leading manufacturers have practically all the business they expect to be able to turn out between now and July 1. Acceptance of more orders would carry them into the third quarter and this they are trying to avoid in view of indications of higher costs in the shape of increased wages. The Youngstown Sheet & Tube Co. recently came out with prices of the \$2.75 per 100 lb., Pittsburgh, for plain wire and \$3 base per keg for nails. These quotations are nominal as this interest is practically out of the market. Prices are not very well defined since there are at least one half dozen different price lists and few makers are taking any business. Prices are given on page 859.

Cold-Finished Steel Bars and Shafting.—There has been no change in prices since a week ago, all makers being on a base of 2.80c., Pittsburgh, for carload lots. Demand shows good diversity of source, but still runs heaviest in the small sizes. Ground shafting is unchanged at 3.20c. base, f.o.b. mill, for carload lots.

Hot-Rolled Flats.—Makers, practically without exception, are sold up for the remainder of the present half year, and while the market still is quotable from 3.05c. to 3.30c., there are few that will consider less than the higher figures for additional tonnages to be delivered between now and July 1. On light, narrow

stock, 3.50c. base is minimum, and there is little open capacity for the second quarter. There is an unusual demand for this material from the automotive industry and for building purposes. Prices are given on page 859.

Cold-Rolled Strips.—Mills are too heavily committed to be interested in more early delivery business and 5c. base, Pittsburgh, now is absolute minimum, with occasional sales as high as 5.25c. base.

Old Material.—The local price for heavy melting steel is not very well defined, since local melters largely remain out of the market and sales are practically nil. Dealers apparently have made sale at as high as \$27.50, delivered, Butler, Pa., and they are further encouraged to hold for high prices, since the equivalent of \$26 to \$26.25, Pittsburgh, recently was paid for 15,000 to 20,000 tons of heavy melting steel at Massillon, Ohio. Important melters here refrain from scrap purchases, as the prices asked are above the cost of producing pig iron and the tendency is to increase the quantity of pig in the mixture. A fair appraisal, based upon what consumers might pay, and what is said to have been done, is \$26.50 to \$27.50. In other grades the market is more clearly established by sales. Shortage of low phosphorus scrap is so acute that it commands almost as much as low phosphorus pig iron. Bundled sheet sides and ends have brought \$23. There is also a very strong market in machine shop turnings, while cast scrap reflects the strength of pig iron.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$26.50 to \$27.50
No. 1 cast, cupola size.....	28.00 to 28.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	26.00 to 26.50
Compressed sheet steel.....	24.00 to 24.50
Bundled sheet sides and ends...	22.50 to 23.00
Railroad knuckles and couplers...	29.00 to 30.00
Railroad coil and leaf springs...	29.00 to 30.00
Low phosphorus standard bloom and billet ends.....	33.50 to 34.00
Low phosphorus, plates and other grades	30.50 to 31.00
Railroad malleable	27.00 to 27.50
Locomotive axles, steel.....	36.00 to 37.00
Steel car axles.....	30.00 to 31.00
Cast iron wheels.....	27.50 to 28.00
Rolled steel wheels.....	29.00 to 30.00
Machine shop turnings.....	21.00 to 21.50
Heavy steel axle turnings.....	22.50 to 23.00
Short shoveling turnings.....	19.00 to 19.50
Cast iron borings.....	22.00 to 22.50
Heavy breakable cast.....	24.50 to 25.00
Stove plate	20.00 to 20.50
Sheet bar crop ends.....	29.00 to 30.00
No. 1 railroad wrought.....	22.00 to 23.00

Youngstown Companies Expect Prosperous Conditions to Continue

Youngstown, March 20.—Leading independent steel makers now believe that the iron and steel markets will show strength throughout the year and that demand will persist through the third and fourth quarters. Earlier in the year, there was some skepticism as to the sustaining influences behind the buying movement current at that time. In the meantime, however, indications point to a heavy demand which will manifest itself through the last half of the year.

Tin plate has recently sold in this district at \$5.50 per base box, and some tonnage has been offered by a non-integrated maker at \$6. In view of the fact that rollers are not inclined to extend their obligations, it appears that even higher prices are anticipated. Principal interests are well covered over the first half.

The sheet market has been one of steadily advancing quotations. Black sheets range from 3.75c to 3.90c, base Pittsburgh, and galvanized from 4.95c to 5.25c. Several galvanized makers in this territory have withdrawn from production, owing to high spelter costs. Box car supply is still somewhat sporadic from week to week and shipments are proportionately affected. More finished steel accumulation, due to car shortage, is reported this week than last.

Chicago

Scarcity of Material More Serious — Heavy Buying of Finished Materials

CHICAGO, March 20.—The outstanding feature of the steel market is the scarcity of material. In fact, it is becoming increasingly difficult to find mills which will accept orders for definite delivery. Specifications, particularly in plates, shapes and bars, are very heavy and the pressure for deliveries against orders on mill books is extraordinary. For the third consecutive week, the bookings of a leading local mill in plates, shapes and bars are unusually large; indeed, the present problem is how to keep new business within reasonable bounds and at the same time supply the principal needs of established customers. Heavy oil storage tank construction promises to continue and fabricating awards and inquiries are liberal notwithstanding the occasional abandonment of a project because of advancing prices. Building prospects in Chicago appear favorable in view of the likelihood of peace among the various crafts. An agreement has been signed by the bricklayers' union and the Associated Builders fixing the wage rate for the year at \$1.25 an hour. The rate for bricklayers is generally the basis on which the wages of other trades are worked out.

Railroad car buying is heavier, particularly among the Eastern roads, and the automobile industry continues to break production records. The fear is expressed in some quarters that industry is rapidly passing into a period of inflation similar to that of 1920. Others, however, are of the opinion that the current year should rather be compared with the war period, as the sharp curtailment of output in Europe has resulted in a growing demand for our products abroad which is likely to continue throughout the year. It is pointed out that even if there be an early settlement of the Ruhr situation, it will take months before European industry can be brought back to its former rate of operations. It is notable that the coal market has stiffened because of export demand and fuel prices are basic in the iron and steel industry. How completely the usual currents of trade have been reversed is illustrated by an inquiry for 2000 tons of spiegeleisen from England, ordinarily a heavy exporter of ferroalloys.

Operating conditions in this district are unchanged.

Pig Iron.—Local iron has advanced another dollar to \$32 base, furnace, as demand continues to expand. The leading Northern producer will blow in a second Mayville stack the middle of next week. There will then be only one important merchant furnace idle in the Chicago district, that being an Iroquois stack. There is another inactive stack at the Iroquois plant as well as one at the Bayview works of the Illinois Steel Co., but these are both so small that they will probably not be put in blast again. Buying has been heavy, particularly for second quarter, although occasionally some third quarter business is placed. A Milwaukee melter has closed for 700 tons of malleable for second quarter while a user in the same city has bought 700 tons of malleable and 300 tons of foundry for third quarter. An Indiana automobile manufacturer has closed for 10,000 tons of foundry, part of it for third quarter. Four thousand of this tonnage was Soo iron. It is also notable that there have been substantial sales of Virginia, Valley and Buffalo iron in Michigan and Indiana. Virginia is quoted at \$29 base, furnace, with 50c up for each advance in silicon, so that on some of the higher silicon grades it can be delivered at Chicago on a competitive basis with local iron which now carries a \$1 silicon differential. At outlying points in Indiana and Michigan, it compares even more favorably with the price of the Chicago product. Southern iron is still available at \$27 base, furnace, although most producers are out of the market. Charcoal has advanced to a minimum of \$33 base, furnace, with some quotations as much as \$2 higher. A local melter has closed for 200 tons of charcoal, while a western Michigan user is inquiring for 2000 tons. Another Michigan consumer is inquiring for 500 tons of charcoal and an equal tonnage of foundry for

second quarter shipment. A Wisconsin melter has closed for 200 tons of low phosphorous at \$30 Eastern furnace, the equivalent of about \$39.75, Chicago. Jackson County silvery producers are expected to advance prices another dollar during the current week.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil.	
1.50, delivered at Chicago.....	\$36.15 to \$38.15
Northern coke, No. 1, sil. 2.25 to 2.75.....	33.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	32.00
Malleable, not over 2.25 sil.....	32.00
Basic	32.00
High phosphorus	32.00
Southern No. 2	33.01
Low phos., sil. 1 to 2 per cent copper free.....	39.79
Silvery, sil. 8 per cent.....	43.29

Ferroalloys.—We note a sale of 300 tons of ferromanganese for late third quarter delivery at \$115 seaboard. While this price is still available for late third quarter and fourth quarter shipment, prompt material is quoted at \$125. Spiegeleisen is to be had at \$40, Eastern furnace, or \$48.58, delivered, Chicago. Fifty per cent ferrosilicon ranges from \$95 to \$100 delivered.

We quote 80 per cent ferromanganese, \$122.56 to \$132.56, delivered; 50 per cent ferrosilicon, \$95 to \$100, delivered; spiegeleisen, 18 to 22 per cent, \$48.58, delivered.

Plates.—Fresh supplies of material for early shipment are exceedingly difficult to obtain from any source; yet demand continues heavy and pressure for deliveries against previous bookings is increasingly insistent. Inquiry for steel for oil tanks is still a feature of the market and with new wells coming in, there is every prospect of a continuance of storage construction. A local tank fabricator has just placed 2000 tons of plates with a Chicago mill and is still inquiring for 5000 tons. The United States Navy is in the market for storage tanks for Honolulu requiring 10,000 tons while an inquiry from the Standard Oil Co. of Indiana calls for 600 tons. New inquiries for freight cars involve 95,000 tons of plates, shapes and bars and 23,000 axles. Orders for 4100 freight cars placed by the New York Central will add 46,000 tons of plates, shapes and bars and 17,000 axles to mill bookings. The leading Chicago mill continues to take plates for indefinite delivery only, while the foremost independent is out of the market.

The mill quotation is 2.45c. to 2.50c., Chicago. Jobbers quote 3.20c. for plates out of stock.

Bars.—Consumers of soft steel bars are experiencing difficulty in finding mills which will accept new business for definite delivery. Prices on material for specific shipment, depending upon the quotations which sellers are willing to name and the urgency of customers' needs, range all the way from 2.35c. to 2.75c., Pittsburgh. The local price for indefinite delivery remains unchanged at 2.35c., Chicago, and the pressure for shipments against orders is increasingly heavy. New business in bar iron is liberal and it is notable that this commodity is being generally substituted for soft steel as the scarcity of the latter becomes more pronounced. Bar iron can still be bought for 2.50c., Chicago mill, although some sales are being made at as high as 2.75c. New demand for rail steel bars continues to grow, while specifications, particularly from the implement industry, are heavier.

Mill prices are: Mild steel bars, 2.35c., Chicago; common bar iron, 2.50c. to 2.75c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.10c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.10c. for rounds and 4.60c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.45c.; bands, 3.85c.

Bolts and Nuts.—Specifications against first quarter are heavy and contracting for second quarter is proceeding steadily at the new prices. Prices ruling in this district are those on page 859, except that they are f.o.b. Chicago instead of f.o.b. Pittsburgh.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to $\frac{3}{4}$ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, \$2.75 off; blank nuts, \$2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Wire Products.—The heavy storms of the past week have interfered with shipments, but mill output remains unchanged at about 80 per cent of capacity. Producers find it necessary to turn away more and more business in their efforts to catch up on their commitments. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 859.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, \$3.75 per 100 lb., extra for black annealed wire, 15c. per 100 lb.; common wire nails, \$3.80 per 100 lb.; cement coated nails, \$3.25 per keg.

Sheets.—With local producers sold out for second quarter, the market continues to grow stronger and prices are largely in the hands of those sellers which are still willing to accept business. Under the conditions it is difficult to ascertain a ruling level of prices for specific shipment, but it is clear that they are closer to the maximum figures quoted below than to the minimums which represent prices at which contracts were closed by producers which are now virtually out of the market.

Mill quotations are 3.50c. to 3.90c. for No. 28 black, 2.65c. to 3.25c. for No. 10 blue annealed and 4.60c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.15c. for blue annealed, 5c. for black and 5.85c. for galvanized.

Cast Iron Pipe.—Prices have advanced to a minimum of \$47 base, Birmingham, for 6-in. and larger while considerable business is moving at \$48 and \$49 base. The United States Cast Iron Pipe & Foundry Co. will supply 200 tons for Rawlins, Wyo., and 800 tons of 6- to 12-in. for Columbus, Ohio. Pending business includes:

Youngstown, Ohio, 1000 tons of 6- to 12-in., bids to be in March 23.

Miscellaneous pipe and specials for riverside pumping station, Milwaukee, 500 tons, March 26.

Holland, Mich., 300 tons of 6- to 12-in., March 19.

Mount Greenwood, Ill., 714 tons of 6- and 12-in., March 20.

Saginaw, Mich., 100 tons of 6-in., March 27.

Grand Rapids, Mich., 500 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$59.20 to \$61.20; 6-in. and above, \$55.20 to \$57.20; class A and gas pipe, \$3 extra.

Rails and Track Supplies.—Light rails have advanced \$2 a ton to 2.25c., mill. While demand for this commodity is somewhat improved, it is far from satisfactory. Sales of angle bars and track bolts and spikes have been in good volume and tie plates are active with one inquiry alone calling for 3000 tons.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.15c. mill; track bolts with square nuts, 4.15c. mill; iron tie plates, 2.75c.; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.80c. base and track bolts, 4.80c. base.

Structural Material.—Fabricating awards reported in this district total 13,900 tons while fresh inquiries, not counting 10,600 tons of oil tank work, aggregate 14,200 tons. The principal limitation on structural business is the scarcity of plain material. It is also notable that shops are now crowded for several months ahead and in adding to their commitment show a preference for small jobs. The largest letting of the week, 9000 tons for the Straus Building, Chicago, was divided between five fabricators—two at Chicago and three at outside points, to insure the more expeditious execution of the work. The steel was bought direct from a local mill by the builder and will be distributed to the five shops for fabrication.

The mill quotation on plain material is 2.45c., Chicago. Jobbers quote 3.20c. for plain material out of warehouse.

Reinforcing Bars.—Demand for both large and small tonnages persists as the scarcity of material becomes more acute. Whereas several building projects have recently been withdrawn from the market because of price advances, the Streaterville Hotel, Chicago, a 600-ton job which was first considered about a year ago, has been revived. Although mill prices have again advanced, the local warehouse price remains unchanged at 3c. and is expected to continue at

that level at least for several weeks. Recent awards include:

Reservoir, St. Paul, Minn., 600 tons to Corrugated Bar Co.

St. Joseph's Convent, Milwaukee, 130 tons to Corrugated Bar Co.

Illinois road work, 400 tons to Kalman Steel Co.

Wisconsin road work, 200 tons to Concrete Steel Co.

Greenville Mill & Elevator Co. building, Greenville, Tex., 200 tons to Corrugated Bar Co.

Mercy Hospital, Cedar Rapids, Iowa, 120 tons to Kalman Steel Co.

Underwriters' Exchange Building, Milwaukee, 175 tons to concrete engineering Co.

Pending business includes:

Baltimore & Ohio Railroad grain elevator, Locust Point, near Baltimore, Md., 2000 tons; John S. Metcalf Co., Chicago, engineers. This to be taken on general contract April 3.

Streaterville Hotel, Chicago, 600 tons.

Peoples Bank & Trust Co., Marietta, Ohio, 125 tons.

Catholic high school, Evansville, Ind., 125 tons; bids on general contract taken March 14.

Illinois Central Railroad, track slabs, 100 tons.

Elks Memorial Building, Chicago, 100 tons; bids to be taken on general contract March 31, by Edgerton Swartout, architect, New York.

Nicollet hotel, Minneapolis, Minn., 900 tons.

Madison Street Bridge, Eau Claire, Wis., 335 tons.

Coke.—Connellsville foundry coke has stiffened and is now commanding \$8.50 to \$8.75 ovens, the freight to Chicago being \$4.16. Local by-product foundry remains unchanged at \$15, delivered Chicago switching district. The Chicago producer hopes to add another battery of ovens by the first of next month.

Old Material.—Consumers are buying practically all grades of scrap; yet the upward tendency of prices is not so marked as recently. In fact, a few items show declines while a number of others remain unchanged. Buying has embraced malleable and cast, low phosphorus, heavy melting and rolling mill grades. Speculative buying on the part of the dealers is less active and this may account for the failure of prices to continue their sharp upward climb. Nevertheless there have been no unusual offerings of yard accumulations and it is intimated that available holdings consist largely of unprepared scrap. In view of another advance in pig iron, scrap prices are expected to show renewed firmness. Railroad offerings include the Rock Island, 4600 tons; the Chesapeake & Ohio, 5000 tons; Chicago & Western Indiana, 1000 tons; and the Wabash, 2000 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	\$27.00 to \$27.50
Cast iron car wheels	28.50 to 29.00
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forced steel car wheels	29.50 to 30.00
Rails for rolling	25.00 to 25.50
Steel rails, less than 3 ft.	27.00 to 27.50
Heavy melting steel	24.00 to 24.50
Frogs, switches and guards cut apart	24.00 to 24.50
Shoveling steel	23.50 to 24.00
Drop forge flashings	20.00 to 20.50
Hydraulic compressed sheets	21.00 to 21.50
Axle turnings	21.50 to 22.00

Per Net Ton

Iron angle and splice bars	26.50 to 27.00
Steel angle bars	22.50 to 23.00
Iron arch bars and transoms	26.50 to 27.00
Iron car axles	30.50 to 31.00
Steel car axles	25.00 to 25.50
No. 1 busheling	20.50 to 21.00
No. 2 busheling	14.50 to 15.00
Cut forge	21.50 to 22.00
Pipes and flues	17.50 to 18.00
No. 1 railroad wrought	21.00 to 21.50
No. 2 railroad wrought	21.50 to 22.00
Steel knuckles and couplers	26.00 to 26.50
Coil springs	26.50 to 27.00
No. 1 machinery cast	27.00 to 27.50
No. 1 railroad cast	25.50 to 26.00
No. 1 agricultural cast	25.50 to 26.00
Low phos. punchings	22.50 to 23.00
Locomotive tires, smooth	23.50 to 24.00
Machine shop turnings	15.00 to 15.50
Cast borings	17.00 to 17.50
Short shoveling turnings	17.00 to 17.50
Stove plate	23.00 to 23.50
Grate bars	22.00 to 22.50
Brake shoes	23.00 to 23.50
Railroad malleable	25.50 to 26.00
Agricultural malleable	25.50 to 26.00

New York

Insistent Demand for Coke for Export—Car Shortage Predicted—Pig Iron Active

NEW YORK, March 20.—Owing to the great activity in contracting for vessels to carry coke to Europe to help in making up the shortage due to conditions in the Ruhr, vessel rates have been in an exceedingly unstable condition during the past week. While, for example, the rate to Rotterdam is still about \$6, there is no certainty as to the future and inquiries for shipments to foreign ports call for delivered prices through April, May and June. Sellers are slow to commit themselves for this advanced delivery, but it is estimated that sales for the present movement up to date amount to 100,000 tons of furnace coke. Vessels are being loaded slowly at Philadelphia and Baltimore and there is already a large accumulation of cars at those ports, there being probably 1000 cars in each city. It is predicted that the unusual demand for cars will cause a shortage in the Connellsville region and higher prices of coke are probable. The usual quotation on furnace coke is \$7.50, Connellsville ovens, for domestic delivery, and \$7.75 for export. Foundry coke is quoted at \$7.50 to \$8, ovens. By-product is unchanged at \$14.84 to \$14.91, Newark and Jersey City points.

Pig Iron.—Buying of foundry grades in the metropolitan district last week amounted to about 25,000 tons and inquiry is fairly active this week. One inquiry is for 4500 tons of Southern iron for a company which buys in New York for delivery at Southern points. While this iron will probably be purchased at \$27, Birmingham, leading companies are out of the market and there is no great tonnage available at that figure. The leading Virginia interest is now quoting \$29, furnace, and at Buffalo \$30 seems to be the lowest quotation, while \$30 is the prevailing price in eastern Pennsylvania for second quarter and \$31 for third quarter. One company which attempted to buy about 2000 tons at \$29.50, Buffalo, finally paid \$30. Among pending inquiries is one for 500 tons for second quarter for a printing press company and 500 tons from a stove company for second quarter. A considerable tonnage of iron brought by Eastern brokers from Duluth last fall and stored at Buffalo has just been sold at a nice profit. The demand on Buffalo furnaces has been increased from Michigan owing to an accident to a Hanna stack at Detroit. Charcoal iron is now quoted \$33, Michigan furnace. It is expected that a Replogle Steel Co. stack will be blown in April 1 and that Adrian will go in at the same time, while it is probable that the Oxford furnace will be blown in at a no distant date. The Delaware Steel Co. has blown in its stack at Chester, Pa.

We quote delivered in the New York district as follows, having added to furnace prices \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	\$34.27 to \$35.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	33.27 to 34.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	32.27 to 33.27
Buffalo, sil. 1.75 to 2.25	34.91
No. 2X Virginia, sil. 2.25 to 2.75	33.94 to 34.94
No. 2 Virginia, sil. 1.75 to 2.25	33.44 to 34.44

Ferroalloys.—Ferromanganese for prompt shipment has sold at a new high level, \$125, seaboard, having been paid for a limited amount. There is a small amount of alloy obtainable from one British producer for shipment in the third quarter at \$115, seaboard, and some sales have been made on this basis. Another British producer is selling the alloy for shipment in the last four months of the year at the same price. Inquiry in general is not brisk. The spiegeleisen market is quiet but very strong. Sales have been made at the new quotation announced a week ago of \$40, furnace, for the 20 per cent alloy. Demand for 50 per cent ferrosilicon continues exceedingly active and business is being done at the minimum quotation of \$92.50, delivered. One seller of 14 to 16 per cent electrolytic ferrosilicon is out of the market for the present. The quotation for this was \$51 to \$53, delivered. There is

a steady demand for ferrochromium for which 12c per lb. of contained chromium, delivered, is the quotation for the 4 to 6 per cent carbon alloy, with the 6 to 8 per cent carbon alloy selling at 11c.

Warehouse Business.—There is a strong demand for all materials carried in stock by warehouses, which is resulting in a slight scarcity of some sizes. Warehouses in this district report inquiries from dealers in other cities for certain sizes on which they are sold out and unable to obtain sufficiently early delivery from mills to satisfy customers. While demand for structural steel continues to show a slight increase as the season advances, the weather conditions have thus far been somewhat of a deterrent. Prices are firm on all items and an advance in prices, which will figure back closer to the prevailing mill quotations, Pittsburgh, is expected in the near future. Both black and galvanized sheets continue to show an upward tendency. Practically the minimum price at which business is now being done is 4.75c. base for black and 5.75c. base for galvanized sheets. Most warehouses are now adhering firmly to 4.90c. and 5.90c. per lb. base on black and galvanized with small lots sometimes bringing 5c. and 6c. per lb. base and one seller, which is a factor in this market has increased its schedule for the second time in a fortnight, now quoting 5.50c. to 5.75c. per lb. base on black sheets and 6.50c. to 6.75c. per lb. base on galvanized. Sellers of wrought iron and steel pipe report an active demand for all sizes, particularly the small sizes of steel pipe. Brass and copper warehouses have increased certain products ¼c. to ½c. per lb. We quote prices on page 880.

Finished Iron and Steel.—While pressure upon the steel mills for steel is perhaps not so heavy as it has been recently, this is due not to any actual lessening in requirements but to the fact that consumers have learned by now that many companies have little or nothing to sell for the first half of the year. More of a disposition to postpone work is noted, and the recommendation of Secretary of Commerce Hoover to the President that all Government construction work be delayed indefinitely is being followed to a limited extent in the field of private building work. The Long Island Railroad, for example, which was in the market for 5000 tons of fabricated steel for grade elimination work, with deliveries of steel scheduled to run into 1925, has decided to postpone the letting of contracts indefinitely because of indifference among the steel companies toward work so far ahead. Some building work is held in abeyance because of inability of prospective builders to get definite promises of delivery of material, and this coupled with the uncertainty as to the labor situation, is creating a little more caution. High prices have apparently not caused holding back so much as other factors. Prices of plates, shapes and bars are now firm at 2.50c., Pittsburgh, the only exception among independent mills being one that is quoting nominally 2.35c., Pittsburgh, but has practically nothing to sell for first half. There is some pressure from consumers for third quarter contracts, and when mills do not desire to make contracts they are asked to enter reservations with price to be fixed later. The demand for concrete bars continues strong. The Concrete Steel Co. has taken the following jobs in the past week: 800 tons for the City Investment Building, Washington; 550 tons for a hydroelectric plant at Sanford, Mich.; 250 tons for a plant for the Viscose Co., Marcus Hook, Pa.; 500 tons for a factory building at Toledo, Ohio; 275 tons for a hotel at Toledo, Ohio; 800 tons for a hotel in Kansas City, Mo.; 216 tons for a library bureau in Brooklyn; 240 tons for road work in Erie County, New York.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, plates and structural shapes, 2.69c. to 2.84c.; bar iron, 2.74c.

Cast-Iron Pipe.—Prices are extremely firm and makers are forced to reject orders in some instances. A maker in this district reports that on new bookings of small sizes four to five months is the average promise of delivery although on larger sizes two to three months can still be promised. Schenectady, N. Y., opened bids on March 20 on about 220 tons of 4-in., 6-in. and 8-in. water pipe, which was also the opening

date of the 10,000 tons of flex-joint pipe for the contract to be let by the City of New York. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$57.50; 4-in. and 5-in., \$62; 3-in., \$67.80, with \$4 additional for Class A and gas pipe. The market on soil pipe is strong with jobbers buying heavily, but still not completely stocked owing to the demand for immediate shipment, so as to have pipe on the ground and ready for use. Makers have advanced their quotations, reducing discounts from list by 5 points. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 13 to 15% per cent off list; heavy, 23 to 25% per cent off list.

Old Material.—This week brought still higher prices for practically all grades of scrap. As high as \$25 per ton is being paid for No. 1 heavy melting steel, delivered eastern Pennsylvania, and one broker in this district reports that he has been paying \$22 per ton for No. 1 heavy melting steel for shipment to Cumberland, Md., which, after adding the freight rate to this point of \$4.41 per ton, brings the delivered price to \$26.41 per ton. For delivery to Bethlehem \$25 per ton is being paid. Mixed borings and turnings are strong at \$15.50 to \$16 per ton, buying price New York, one of the most active markets at present being shipments to Bethlehem. On stove plate New Jersey foundries are paying \$22 per ton and more delivered. Specification pipe is generally being bought for delivery to Lebanon, Milton and Columbia, Pa., at \$20 to \$21 per ton, delivered. All grades continue scarce and no tendency toward weakness is apparent. No. 1 heavy melting steel is quotable this week at \$21 to \$21.50 per ton and railroad quality at \$22 to \$22.50 per ton, buying prices New York. Some material is beginning to appear from New England points.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$21.00 to \$21.50
Steel rails, short lengths, or equivalent	22.00 to 22.50
Rails for rolling.....	22.00 to 23.00
Relaying rails nominal.....	29.00 to 30.00
Steel car axles.....	25.00 to 26.00
Iron car axles	29.00 to 30.00
No. 1 railroad wrought.....	22.00 to 23.00
Wrought iron track.....	22.00 to 22.50
Forge fire	15.50 to 16.00
No. 1 yard wrought, long.....	19.50 to 20.00
Cast borings (clean).....	15.50 to 16.00
Machine-shop turnings	16.50 to 17.00
Mixed borings and turnings.....	15.50 to 16.00
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	16.75 to 17.25
Stove plate	19.00 to 19.50
Locomotive grate bars.....	20.00 to 21.00
Malleable cast (railroad).....	21.50 to 22.00
Cast-iron car wheels.....	22.00 to 23.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast.....	\$26.00 to \$27.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	25.00 to 26.00
No. 1 heavy cast, not cupola size	23.00 to 24.00
No. 2 cast (radiators, cast boilers, etc.)	21.00 to 22.00

Detroit Scrap Market

DETROIT, March 21.—Melters in this district have been forced to pay high prices on scrap, being unable to secure off grades of pig iron and where there have been any small tonnages of this material, the freight rates have been prohibitive. The melt is very heavy due to intensive automotive production and every effort is being made to discount the labor situation which will confront industries when the heavy building and road construction programs are begun with the advent of warmer weather. Prices are about the same as those quoted a week ago.

The following prices are on a gross ton basis f.o.b. cars producers' yard, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel.....	\$22.50 to \$24.00
Shoveling steel.....	22.50 to 24.00
No. 1 machinery cast.....	26.00 to 28.00
Cast borings.....	17.00 to 18.00
Automobile cast scrap.....	29.00 to 31.00
Stove plate	20.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Turnings	16.50 to 17.75

Boston

Stronger Pig Iron Market the Past Week—Scrap Prices Buoyant

BOSTON, March 20.—A further general uplift in prices, averaging \$1 a ton, featured the pig iron market the past week. Buying was active, but not to the recent extent. Buffalo, Virginia and charcoal furnaces took the bulk of the business. A 1000-ton lot of No. 1X Buffalo taken by a machinery maker, and 1500 tons of charcoal bought by a firm largely engaged on railroad work, represented the largest transactions, with numerous 500-ton and smaller lots constituting the average. Sales were for second and third quarter deliveries. Eastern Pennsylvania sold at \$33.65 to \$34.65 delivered base, up \$1 for the week; Buffalo at \$34.91 delivered base, up \$1 to \$2; Virginia at \$33.92 to \$34.92 delivered base, unchanged to \$1 higher; Alabama at \$36.60 delivered base, unchanged to \$1 higher; while lake charcoal sold at \$31.50 and \$33.50, the latter price making a net gain of \$2 for the week. Foundries are now well covered for second quarter, consequently interest centers in third quarter iron. The New England melt has materially increased the past month or two, but is below capacity due to shortage of molders.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75.....	\$34.15 to \$35.15
East. Penn., sil. 1.75 to 2.25.....	33.65 to 34.65
Buffalo, sil. 2.25 to 2.75.....	35.41
Buffalo, sil. 1.75 to 2.25.....	34.91
Virginia, sil. 2.25 to 2.75.....	34.42 to 35.42
Virginia, sil. 1.75 to 2.25.....	33.92 to 34.92
Alabama sil. 2.25 to 2.75.....	37.10
Alabama sil. 1.75 to 2.25.....	36.60

Iron Imports.—In the week ending March 17, 496 tons of English, 409 tons of Belgian and 1023 tons of German, a grand total of 1928 tons of foreign pig iron, were landed at this port. Importations for the previous week were 3023 tons, consisting of 1990 tons of Scotch and 1033 tons of Continental. In addition, 75 tons of English ferromanganese were received during that period. Local receipts of foreign iron at this port for March to date aggregate 5248 tons. A large percentage of this iron was sold before it arrived.

Warehouse Business.—Numerous advances in small warehouse goods are reported, including an average of 10 per cent in bolts and nuts, washers and cap and set screws; 12½ per cent in copper rivets and burrs; and ¼c. a pound in sheet lead, which is now 15c. per lb. base, and in sheet zinc, which is now 10¼c. per lb. in 600-lb. lots. Iron and steel prices are unchanged, but decidedly firm, while the movement out of warehouses shows a slow but consistent expansion. Cold-rolled strip steel has been advanced to \$5 per cwt., f.o.b. Pittsburgh.

Jobbers quote: Soft steel bars, \$3.36½ per 100 lb.; flats, \$4.15; concrete bars, \$3.51½ to \$3.64; structural, angles, channels and beams, \$3.46½; tire steel, \$4.80 to \$5.15; open-hearth spring steel, \$5 to \$6.50; crucible spring steel, \$12; bands, \$4.55 to \$5.05; hoop steel, \$5.05 to \$5.55; cold rolled steel, \$4.30 to \$4.80; toe calk steel, \$6.15; refined iron, \$3.36½ per 100 lb.; best refined iron, \$4.75; Wayne iron, \$5.50; Norway iron, \$6.60 to \$7.10; steel plates, \$3.46½ to \$3.70; No. 10 blue annealed sheets, \$4.36½ a 100 lb.; No. 28 black sheets, \$5.65; No. 28 galvanized, \$6.65.

Coke.—An upward tendency to Connellsville foundry coke prices, with sales here the past week at \$9 and \$9.25 on cars shipping point or \$14.55 to \$14.80 delivered New England points, has strengthened the position of New England by-product coke producers, although they have not changed their prices. The New England Coal & Coke Co. is still on a \$16 delivered base within the \$3.10 freight zone, and the Providence Gas Co. \$15. Desirable coals, according to common report here, cost coke makers more than a year ago. If, as report has it, the United States is to export fuel, including coke, the position of the New England coke makers will be further strengthened. Railroads are supplying more cars to the New England coke makers, but the car supply situation is far from free, and deliveries therefore more or less backward.

Old Material.—With consumers constantly raising their bids and owners holding for higher prices, the

scrap market is more excited than at any time since war days. Actual sales for delivery outside New England are restricted by the unwillingness of material owners to sell. A 500-ton lot, bought by an eastern Pennsylvania mill at \$25.50 on cars, represents the top of the heavy melting steel market, an advance of \$1 for the week. Railroad wrought jumped \$1.50 on limited sales. Forge fire scrap brought \$17.75 on cars; horseshoes \$19, an advance of \$1.50; cotton ties \$15 to \$15.75, contrasted with \$13 to \$13.50 a week back; machine shop turnings for steel mill use, \$1.50 better than a week ago; other borings and turnings, as well as skeleton, 50c. a ton more. Small lots of special specification shafting sold at \$25 on cars. Ordinary shafting scrap is available at around \$23. The pipe market lifted another 50c. on small bookings. New England foundries are bidding actively for machinery cast. A Fall River, Mass., concern sold cotton machinery cast at \$27.50 on cars; the freight was \$5, and the gross delivered cost to consumer \$32.50. Common No. 1 machinery sold generally the past week at or close to \$27 delivered. No. 2 and No. 1 and No. 2 mixed are far more active, however. Fifty-fifty mixed, in 100-ton lots, fetched \$25.75 delivered, and mixtures of mostly No. 2 at \$24 and \$24.50. Railroad malleable is skyrocketing, most sales the past week being just under \$29 up to \$30 delivered. Boston and Worcester interests are making direct bids of \$25 to \$26 delivered for heavy dynamo cast. Dealers ask 50c. to \$1 a ton more for this material.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$26.00 to \$27.00
No. 2 machinery cast.....	24.00 to 26.00
Stove plate	20.00 to 20.50
Railroad malleable	26.00 to 30.00
Street car wheels	25.00 to 25.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$20.00 to \$20.50
No. 1 railroad wrought	21.50 to 22.00
No. 1 yard wrought	19.50 to 20.00
Wrought pipe (1-in. in diam. over 2 ft. lng).....	16.00 to 16.50
Machine shop turnings.....	16.75 to 17.25
Cast iron borings rolling mill.....	16.50 to 17.00
Cast iron borings, chemical.....	20.00 to 21.00
Blast furnace borings and turnings.....	14.50 to 15.00
Forged scrap and bundled skeleton.....	17.00 to 17.50
Shafting	23.00 to 24.00
Street car axles.....	23.00 to 24.00
Rails for rerolling.....	21.00 to 21.50

Buffalo

Pig Iron Prices Again Advanced Following Sales of Large Tonnages

BUFFALO, March 19.—Selling of pig iron is in the hands of three furnaces and one of these has booked large tonnages. This producer advanced prices twice in a week, but about 25,000 tons was taken before the second advance was put in effect. Two sellers are now quoting \$29.50 for silicon 1.75 to 2.25; \$30 for silicon 2.25 to 2.75 and \$31 for silicon 2.75 to 3.25. The third factor in the present line up is asking 50c. more. Third quarter buyers are not very active although in the 25,000 tons booked at one office a large part was for that period. Not any of the sellers are anxious to book too far ahead. The differential of \$1 for No. 1 foundry is uniform. In the total commitment of one furnace, one order was for 5000 tons, another for 4000 and several 1000-ton lots. The whole situation reveals strength. Malleable is \$30.50.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.....	\$30.50
No. 2X foundry, 2.25 to 2.75 sil.....	30.00
No. 2 plain, 1.75 to 2.25 sil.....	29.50
Basic	30.00
Malleable	30.50
Lake Superior charcoal.....	36.78

Finished Iron and Steel.—Demand is greater for practically every product and pressure for delivery more intense. Considerable inquiry is coming from New England points and greater quantities are being sought. None of the selling factors is in any better position. One office has been instructed not to accept sheet business for second quarter and can accept only

black sheets for April and May delivery in limited tonnages. This is due to the mill carrying over a greater tonnage of first quarter business than was expected. Bar prices as high as 2.50c. are frequently quoted and orders accepted only on mill terms. Plate prices range from 2.50c. to 2.70c. Pressure for wire appears to be greater than for any other product. A district car builder has an inquiry out for 17,000 tons, 65 per cent plates, 30 per cent shapes and the rest in bars. The material is for use in Erie Railroad gondolas. Warehouse demand is without change.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.50c. plates, 3.50c.; soft steel bars, 3.40c.; hoops, 4.50c.; bands, 4.20c.; blue annealed sheets, No. 10 gage, 4.20c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5.10c.; cold rolled hound shafting, 4.25c.

Old Material.—Unusual sales of heavy melting steel have been made on contracts calling for 30 to 60-day delivery. Mills which have bought have insisted that the deliveries be made within the 60-day limit. Steel has advanced and is now quoted at \$24.50 to \$25.50, with several tonnages having been sold at \$25.75. One consumer who has been disinterested for several months has again come into the market for steel.

Heavy melting steel.....	\$24.50 to \$25.50
Low phos., 0.04 and under.....	28.00 to 29.00
No. 1 railroad wrought.....	22.00 to 23.00
Car wheels	26.00 to 27.00
Machine shop turnings.....	18.00 to 19.00
Cast iron borings.....	19.00 to 20.00
No. 1 busheling.....	23.00 to 23.50
Heavy steel turnings.....	23.00 to 23.50
Stove plate	23.00 to 24.00
Grate bars	23.00 to 24.00
Bundled sheet stampings.....	18.00 to 19.00
No. 1 machinery cast.....	26.00 to 27.00
Hydraulic compressed	23.00 to 23.50
Railroad malleable	27.50 to 28.50

St. Louis

Round Lot of Pig Iron Sold for Third Quarter—Melt Increases

ST. LOUIS, March 20.—The St. Louis Coke & Chemical Co., whose make of pig iron for the first half has been sold, during last week sold about 3500 tons of foundry and car wheel grades for third quarter delivery. Sales for barge and rail shipment by the Sheffield maker amounted to 850 tons. These constituted the principal sales. While the market has not been so active, it is still strong, with Northern iron at \$31, Chicago and Southern make at \$27, Birmingham. The barge and rail shipments are lower than the all rail movement. Pending inquiries are for about 3500 tons. The melt in the district continues to increase. There is an inquiry before the market for 500 tons of ferromanganese and 100 tons of ferrosilicon, of which very little is to be had.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Birmingham (rail and water), \$5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25.....	\$33.16
Northern malleable, sil. 1.75 to 2.25.....	33.16
Basic	33.16
Southern fdy., sil. 1.75 to 2.25.....	32.17

Finished Iron and Steel.—Inquiries for all kinds of finished iron and steel in large quantities continue to reach this market, but most mills are still out of the market and inquiries are passed on to the home sales office. Plans of the St. Louis Jewish Hospital have been submitted to fabricators here. It is a \$1,000,000 all-steel job; the exact tonnage has not been figured, but is believed to be about 1500. Anderson, Graham, Probst & White, Chicago, are the architects. A fabricator in southern Missouri has been trying to place an order for 500 tons of structural steel. The Pennsylvania Lines West of Pittsburgh want prices on 100,000 to 500,000 main line tie plates.

For stock out of warehouse we quote: Soft steel bars, 3.25c. per lb.; iron bars, 3.25c.; structural shapes, 3.35c.; tank plates, 3.35c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, cold rolled, one pass, 5c.; cold drawn rounds, shafting and screw stock, 4.25c.; structural rivets, 3.90c. per 100 lb.; boiler rivets, 4c.; tank rivets, $\frac{7}{8}$ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, \$2.75; and tapped, \$2.75 off list.

Coke.—Colder weather last week caused a revival of interest in domestic grades. Foundry coke is in better demand, with a short supply. Considerable foundry coke has been moving from the South at \$9, Birmingham.

Old Material.—The market for old material continues strong, with prices higher on almost every item. Buyers are taking on tonnages, and with stocks low are expected to be in the market for a great deal more. Rain during the week delayed work in yards of dealers. Very little scrap is being offered. The Wabash Railway has a 4000-ton list, most of which will go east. The Missouri-Kansas-Texas Railway has a list of about 1500 tons and the Nashville, Chattanooga & St. Louis about 20 cars.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	\$22.00 to \$22.50
Rails for rolling	23.75 to 24.75
Steel rails less than 3 ft.	25.50 to 26.00
Relaying rails, standard section	37.00 to 39.00
Cast iron car wheels	28.50 to 29.00
Heavy melting steel	22.75 to 23.25
Heavy shoveling steel	22.50 to 23.00
Frogs, switches and guards cut apart	23.50 to 24.00
Per Net Ton	
Heavy axles and tire turnings	16.00 to 16.50
Steel angle bars	21.50 to 22.00
Iron car axles	28.50 to 29.00
Steel car axles	24.50 to 25.00
Wrought iron bars and transoms	25.00 to 25.50
No. 1 railroad wrought	21.25 to 21.75
No. 2 railroad wrought	21.25 to 21.75
Railroad springs	24.50 to 25.00
Steel couplers and knuckles	24.50 to 25.00
Cast iron borings	15.00 to 15.50
No. 1 busheling	18.50 to 19.00
No. 1 railroad cast	25.00 to 25.50
No. 1 machinery cast	25.00 to 25.50
Railroad malleable	24.00 to 24.50
Machine shop turnings	14.00 to 14.50

Birmingham

Alabama Pig Iron Sells Freely at \$27—Coke Sold for Export

BIRMINGHAM, ALA., March 20.—Birmingham iron sold in quantities and unwaveringly at \$27 base last week. Lots of 1000 to 3000 tons for Middle Western and Southern consumption were not infrequent. A large pipe maker is reported to have closed for 10,000 tons. Spot orders involving specified analysis are not always accommodated, several being turned down last week, one being for 500 tons. Makers could get more than \$27 for prompt iron if they asked it, but seem inclined to book third quarter capacity at that base. The Alabama Co. blew in the second Gadsden stack March 15, and Oxmoor stack of the Tennessee company now seems an April 1 resumption feature. Sloss-Sheffield Steel & Iron Co. promises a sixth stack in April, one at North Birmingham. At the close of the week Alabama had 16 stacks on merchant iron and 10 on basic. Export inquiries for pig iron have not been considered owing to pressure of domestic demand. The Pacific Coast has also been unable to place prompt business. The bulk of the business done last week was for third quarter.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	\$27.00
Basic	26.00
Charcoal, warm blast	34.00

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has booked the following: Talladega, Ala., 4 miles of 6-in. pipe; Gas Co., New Orleans, 1000 ft. of 24-in. and 1000 ft. of 16-in.; Lenore, N. C., 20,000 ft. of 8-in. 5-meter pipe. Deliveries on new business in very small sizes are not promised before September. Shops are overloaded on popular sizes. Four-inch sizes rule at \$51 to \$52, 6-in. at \$47 to \$48 and 8-in. and up closer to \$47 than any other base.

Finishing Mills.—Double turn continues at the Bessemer bar, guide and plate mills of the Tennessee company, at structural and tie-plate mills in Fairfield and at rail and blooming mills at Ensley. A cargo of 9500 tons of manganese ore from Brazil for the Tennessee company arrived at Mobile Sunday and a ship left that

port with 6000 tons of rails and other steel products for Japan with another loading for Japan. A third ship is to load for Japan at the end of the month. All independents are at as near 100 per cent capacity as possible. Steel bars rule at \$2.50, f.o.b. Birmingham.

Coal and Coke.—Ruhr basin troubles caused a rush demand for Alabama coke last week and 10,000 tons were quickly engaged for Hamburg, South American and other countries. The base was \$8 to \$8.50, f.o.b. Birmingham. The market rose at end of the week to \$9 for spot coke.

Old Material.—Scrap of all kinds is very brisk and rush shipments are asked by all melters. Prices are up about \$2 a ton.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Old steel rails	\$18.00 to \$20.00
No. 1 steel	16.00 to 18.00
No. 1 cast	21.00 to 23.00
Car wheels	21.00 to 23.00
Tramcar wheels	20.00 to 22.00
Stove plate	18.00 to 19.00
Cast iron borings	12.00 to 13.00
Machine shop turnings	12.00 to 13.00

Cincinnati

Sanitary and Automobile Companies Buy Round Tonnages of Pig Iron

CINCINNATI, March 20.—The pig iron market showed a lot of activity during the week. The principal sale was made to a Kentucky sanitary manufacturing company for third quarter, the tonnage being reported to be 20,000, Southern iron, at \$27 base, Birmingham. The purchase was divided among four furnaces. A Michigan automobile manufacturer bought 10,000 tons for second quarter, 4000 tons of this being Canadian iron and the rest from Buffalo. It is reported that the Canadian iron was sold at 75c. a ton less than domestic iron. A central Ohio pipe manufacturer bought 1500 tons of various grades. Sales to Cincinnati, Terre Haute and Detroit melters of 1000 tons each were also reported. An Ohio River melter took 1000 tons of Virginia iron at \$27.50 furnace, and local melters took 500 and 300 tons. We also note a sale of 800 tons of Southern charcoal iron at \$35, furnace. A sale of 400 tons of Bessemer was made today at \$32, Ironton. Prices generally are strong, with advances reported from some districts. In the South, \$27 remains the market, and it is said that furnace interests there are opposed to further advances. Jackson County silveries are scheduled for another advance of \$1 and most Virginia furnaces have advanced to \$29 though \$28 was being quoted Monday. Several fair-sized inquiries are current. A Springfield piano plate manufacturer is inquiring for 5000 tons of foundry, from May to September, and a Hamilton melter is in the market for 1000 tons of Southern. The American Brake Shoe & Foundry Co. is inquiring for 4500 tons for Southern plants and an inquiry is also current for 1500 tons of foundry for western Indiana. A local melter will probably close on 3000 tons of Southern for third quarter early this week.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$31.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	31.55
Ohio silvery, 8 per cent	40.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	33.27
Basic Northern	31.27
Malleable	32.27

Structural Material.—A number of small jobs have been awarded, but new inquiries are light. The Fort Pitt Bridge Co. has taken 600 tons of bridge work for the Big Four Railroad at Indianapolis. The Virginia Bridge & Iron Co. has been awarded 300 tons for the L. & N. at Evansville, Ind., and the Riverside Bridge Co. has been awarded the steel for the Labor Temple at Louisville, Ky., about 300 tons. The Elks Temple at Indianapolis, 600 tons, has been awarded to the Central States Bridge Co. No award has been made on 300 tons of steel involved in the new car barns and power house

of the Louisville Railway Co. The Pure Oil Co., Columbus, will shortly ask for bids on a 10,000-bbl. refinery at Smith's Bluff, Tex., and will also purchase a number of tanks, from 65-bbl. capacity to 55,000-bbl. capacity.

Reinforcing Bars.—The demand for reinforcing bars continues active. An addition to St. Anthony's Hospital, Louisville, will require 250 tons; the Kresge Building, Indianapolis, 300 tons; dormitory at Miami University, Oxford, Ohio, 200 tons; public school, Cincinnati, 150 tons, and a contemplated apartment hotel, Indianapolis, 300 tons. Road work under bid in Ohio, Indiana, Kentucky and West Virginia involves approximately 3000 tons.

Warehouse Business.—Local jobbers report the demand for finished materials continuing strong, with improvement noted in cold-finished steel. Reinforcing bars are very active, as are small angles. Rails are becoming scarce, and some sizes are absolutely out. Wire fence is moving in good shape from jobbers' stocks. Prices are strong at last week's quotations.

Cincinnati jobbers quote: Iron and steel bars, 3.40c.; reinforcing bars, 3.50c.; hoops, 4.45c.; bands, 4.15c.; shapes, 3.50c.; plates, 1/4-in. and heavier 3.50c., lighter 3.75 1/4c.; cold-rolled rounds, 4.20c.; cold-rolled flats, squares and hexagons, 4.70c.; No. 10 blue annealed sheets, 4.15c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 6c.; No. 9 annealed wire, \$3.30 per 100 lb.; common wire nails, \$3.30 per keg, base.

Finished Materials.—A let-up in the demand for finished materials is attributed to the fact that consumers have come to the realization that mills are not anxious to book any more business until such time as they can be reasonably sure of making deliveries. Some mills have booked their entire second quarter output, and are now quoting five to six months delivery on new business offering, with prices to be named at date of shipment. It is said, however, that some capacity has been reserved for second quarter, and this week an independent producer of plates has taken on some business in heavy plates to balance up its order books. While heavy premiums are said to be offered for early delivery, the going market on bars, shapes and plates ranges from 2.35c. to 2.50c., Pittsburgh, and orders carrying no definite delivery promises are being taken by some mills at these prices. Sheets are in heavy demand, and most mills are booked solidly for second quarter. Prices are very strong, but there are no evidences of heavy premiums being paid in this district for early delivery. On blue annealed sheets the range continues to be from 2.75c. to 3c., and on black, 3.75c. to 4c., with 3.85c. being the common quotation. Galvanized sheets have sold in fair-sized lots at 5c., but 4.90c. about represents today's market. Tin plate is reported to have sold as high as \$5.50 per box, but \$5.25 is reported as more nearly the actual market. There has been a small demand for track fastenings, including more particularly spikes and track bolts, but tie plates are not in demand. Light rails are showing little activity, and while they are nominally quoted at 2.15c., it is said that 2.25c. at least would have to be paid. Some mills are understood to be contracting with jobbers for wire nails at \$2.90 to \$3 per keg, for second quarter. Little interest is being shown in third quarter business. The Louisville & Nashville Railroad will probably award 8000 cars this week, bids having closed Monday. Southern soil pipe makers have advanced prices to \$70 per ton.

Coke.—Furnace coke is very active and foundry is also in good demand. Prices are showing a lot of strength and have advanced from 25c. to 50c. in some districts. Much of this strength is reported to be caused by export demand, but little actual business is reported to have been booked for shipment abroad outside the Connellsville district. We quote Connellsville furnace coke, \$7.25 to \$7.75; foundry, \$8.50 to \$9.50; Wise County foundry, \$9 to \$10; New River foundry, \$12, and by-product foundry \$11, Connellsville basis.

Old Material.—While the local market is not active, the demand for steel grades from outside districts continues strong and prices on some items are higher. Bundled sheets, heavy melting steel, car wheels, cast borings, railroad cast and burnt scrap have been

marked up 50c. a ton as a result of inquiries from outside points.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	\$17.50 to \$18.00
Iron rails	20.00 to 20.50
Relaying rails, 50 lb. and up....	29.00 to 29.50
Rails for rolling.....	21.50 to 22.00
Heavy melting steel.....	21.50 to 22.00
Steel rails for melting.....	20.00 to 20.50
Car wheels	23.00 to 23.50

Per Net Ton	
No. 1 railroad wrought.....	18.50 to 19.00
Cast borings	16.00 to 16.50
Steel turnings	15.00 to 15.50
Railroad cast	22.00 to 22.50
No. 1 machinery cast	23.50 to 24.00
Burnt scrap	16.00 to 16.50
Iron axles	26.50 to 27.00
Locomotive tires (smooth inside)	19.00 to 19.50
Pipes and flues.....	15.50 to 16.00

Cleveland

Pig Iron Fairly Active—Steel Makers Inquire for Basic

CLEVELAND, March 20.—A number of blast furnaces have sent out inquiries for ore with the view of lining up their season's requirements. They are also asking for prices. Some additional reservations were made during the week. It is expected that prices will be named about April 1, although ore firms are in no hurry to begin making sales. Additional sales of dock ore in three lots aggregating 50,000 tons are reported.

Pig Iron.—The market continues fairly active, although sales were not as heavy during the past week as in the previous week. Prices are very firm, but the upward tendency has not been so marked as during the previous week. Much of the buying is for the third quarter. One interest during the week sold 10,000 to 15,000 tons, mostly for the third quarter. Steel makers are beginning to take an interest in basic iron for the third quarter. We note the sale of 5000 tons of basic iron for April shipment by a Valley furnace at \$31 and the Follansbee Bros. Co. has an inquiry out for 10,000 tons of basic for June and third quarter delivery. An Ohio steel maker is understood to be in the market for 30,000 tons of basic for the third quarter. Foundry iron is quoted at a minimum of \$31 by Lake and Valley furnaces. One Valley producer has advanced its price to \$31.50 and a lake furnace made sales at the same price and has also booked orders at \$32 for prompt shipment. Both Cleveland producers of merchant iron are now out of the market, so that the price of pig iron in this city is based on the prices quoted by outside producers, plus the freight rate from the Valley district. A Cleveland consumer has bought 1000 tons of foundry iron for the third quarter from an outside furnace. The General Electric Co., which recently inquired for 1700 tons of foundry iron for its Erie works, has divided that tonnage between three or four producers. A Springfield, Ohio, consumer is inquiring for 5000 tons of malleable or foundry iron for delivery from May through the third quarter and another inquiry for 3000 tons of the same grades is pending. A Valley furnace during the week sold 2000 tons of Bessemer iron at \$30 and 2000 tons of low phosphorus iron at \$35 in small lots. Southern iron is firm and unchanged at \$27, and with little available for the second quarter. A leading sanitary interest has purchased 5000 tons of Southern iron at \$27.50 for 2.25 and 2.75 silicon, from one producer and is understood to have made an additional purchase of from 5000 to 10,000 tons, all for the third quarter.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and a \$6 rate from Birmingham:

Basic, Valley furnace.....	\$31.00
Northern No. 2 fdy., sil. 1.75 to 2.25	\$32.77 to 33.27
Southern fdy., sil. 1.75 to 2.25....	33.00
Malleable	32.77 to 33.27
Ohio silvery, 8 per cent.....	41.52
Standard low phos., Valley furnace	35.00

Semi-Finished Material.—Several inquiries for sheet bars, including one for 10,000 tons, are pending, and the demand is far in excess of the supply. A Cleveland producer booked several orders during the week and has now withdrawn from the market for the second quarter. This tonnage has been taken at \$45, Youngstown, for April shipment. These May and June prices will be the prevailing quotations.

Sheets.—The supply of blue annealed sheets has become very short. A local mill has advanced these to 3.25c., which is the common quotation of the few mills that can make early deliveries. Galvanized sheets are also firmer, some mills having advanced these to 5.25c. Black sheets are quoted at 3.85c.

Jobbers quote steel bars, 3.21c.; plates and structural shapes, 3.31c.; No. 9 galvanized wire, 3.75c.; No. 9 annealed wire, 3.15c.; No. 28 black sheets, 4.60c.; No. 28 galvanized sheets, 5.75c.; No. 10 blue annealed sheets, 3.60c. to 3.91c.; cold-rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.01c.; narrower than 1 in. or lighter than No. 20 gage, 4.51c.

Reinforcing Bars.—A large amount of work requiring fair-sized tonnages of reinforcing bars is coming out. One maker has advanced rail steel bars to 3.50c. Inquiries include the Ward Baking Co., New Haven, Conn., factory; 850 tons; Baldwin Reservoir, Cleveland, 150 tons; water works, Wheeling, W. Va., 300 tons; Lake County Bridge, Painesville, Ohio, 200 tons, and Babies' and Children's Hospital, Cleveland, 225 tons.

Warehouse Business.—Jobbers predict another advance in their sheet prices, owing to the recent advances in mill prices which with present warehouse prices leave small margins for the jobber. Some local hardware jobbers advanced nails and wire 15c., but later restored the old prices because all distributors did not join in the advance.

Bolts, Nuts and Rivets.—Second quarter contracts for bolts and nuts are being entered at the present prices, which are firm. Makers are being hampered somewhat by the scarcity of steel. Rivet specifications are heavy and consumers are placing second quarter contracts freely at 3.25c. for structural and 3.35c. for boiler rivets. Local makers are not attempting to get higher than these prices.

Finished Material.—Inquiry for finished iron and steel has fallen off considerably. This is probably because most mills are either out of the market or have only limited tonnages to offer and because most consumers have placed orders for their requirements for a considerable period. While some consumers are suffering for material, mills appear to be taking care of customers' requirements fairly well. Automobile and parts manufacturers in Detroit are somewhat worried about getting steel as fast as needed. Some of these are completing plant additions and expect to increase their output shortly. The Ford Motor Co. is operating on a schedule of 156,000 cars for March. Some construction work in Cleveland is being postponed because of high construction costs, but so far the postponement seems to have had no effect on building operations in the surrounding territory, and Detroit, where wages have not advanced as much as in Cleveland. Plates are in good demand and higher. It seems probable that 2.35c. will shortly become the minimum quotation on plates. A leading producer has quoted that price on a 500-ton lot and a local mill has advanced its price to 2.75c. Quotations by Eastern mills range from 2.90c. to 3c., Pittsburgh, and sales are being made at those prices for delivery in 45 days. Light plates are very scarce and a Cleveland mill is taking orders for these subject to prices prevailing at time of shipment. Structural material is quoted at 2.35c. to 2.85c., the higher price being named by an Eastern mill. On steel bars 2.25c. is still being quoted by some of the mills and others are asking 2.35c. to 2.50c. Sales of forging bars in lots up to 500 tons are reported in Detroit at 2.35c. to 2.50c., although as high as 3c. has been paid. Bands are quoted at 3.05c., Pittsburgh, with 50c. higher for the light gages. Cold-rolled strip steel ranges from 4.75c. to 5.25c.

Coke.—The market on foundry coke is very firm

and some makers have advanced prices 50c. per ton. We quote standard Connellsville foundry coke at \$8.50 to \$9 per ton.

Old Material.—A Massillon, Ohio, consumer has purchased a round lot of heavy melting steel at a reported price of \$28 and local dealers are paying \$27.50 for shipment to this consumer, small lots being sold at that price. Sales of the same grade are reported to dealers at \$27 for Youngstown shipment. The market is not active, mills being unwilling to pay present prices unless they are running short of material. Prices have further advanced from 50c. to \$1 a ton and the market is very strong.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$25.00 to \$25.50
Rails for rolling.....	28.00 to 28.50
Rails under 3 ft.....	27.00 to 28.00
Iron rails.....	23.00 to 24.00
Low phosphorous melting.....	27.00 to 28.00
Cast borings.....	20.00 to 20.50
Machine shop turnings.....	19.00 to 19.25
Mixed borings and short turnings.....	19.50 to 20.00
Compressed steel.....	23.00 to 24.00
Railroad wrought.....	22.00 to 23.00
Railroad malleable.....	28.00 to 28.50
Light bundle sheet stampings.....	19.50 to 20.00
Steel axle turnings.....	23.00 to 23.50
No. 1 cast.....	27.00 to 28.00
No. 1 busheling.....	19.25 to 19.50
Drop forge flashings over 10-in.....	21.00 to 22.00
Drop forge flashings under 10-in.....	21.00 to 22.00
Railroad grate bars.....	22.00 to 23.00
Stove plate.....	22.00 to 23.00
Pipes and flues.....	21.00 to 22.00

Philadelphia

Foundry Pig Iron Again Advanced—Scrap Prices Are Higher

PHILADELPHIA, March 20.—Further advances in pig iron and scrap prices have occurred within the week, and there has been a stiffening in prices of semi-finished and finished steel products. Foundry iron is now at \$31, furnace, for No. 2 plain, basic is quoted at \$29, furnace, and other grades are proportionately higher. Virginia iron has also been advanced. Plates, shapes and bars are firm at 2.50c., Pittsburgh, for early delivery from Eastern mills, blue annealed sheets are 3c., minimum, billets are \$45 for rerolling quality and \$52 to \$55 for forging quality. There is not as heavy pressure upon the steel mills as was in evidence several weeks ago, but Eastern mills could easily sell their product for the entire first half if they desired to do so. Most of them are booking business with more caution, as they have substantial backlogs, and are holding open some second quarter tonnage. In bars and structural shapes the larger mills are sold up more heavily than in plates.

Pig Iron.—The demand for pig iron keeps up at a fairly good rate. One Eastern furnace company last week booked not less than 20,000 tons of foundry iron in the New England, New York and Philadelphia districts. A part of this tonnage went at \$30, base, but late last week the price was advanced to a minimum of \$31 for No. 2 plain, \$32 for No. 2 and \$33 for No. 1X. Other active sellers have followed the advance, and one company has named prices of \$32 for No. 2 plain, \$33 for No. 2X and \$34.50 for No. 1X, all f.o.b. furnace. Sufficient sales have been made at the \$31 base price to establish that as today's minimum for eastern Pennsylvania and New Jersey iron. Inquiry for third quarter is making its appearance and when prices are quoted they are either at the prompt delivery level or \$1 higher. There has been a corresponding stiffening in prices of Virginia iron. One furnace in that district is quoting a minimum of \$28 for No. 2 plain, but the others have gone up to \$29, furnace, with some sales at the latter figure. The Virginia situation has improved to such an extent that other furnaces are being put in readiness for operation, these including one stack of the Virginia Iron, Coal & Coke Co. and the Princess, Goshen and Oriskany furnaces. In the eastern Pennsylvania and New Jersey district increased iron output is in sight. The Replogle Steel Co. will put in its second Wharton furnace about April 1, the second Warwick furnace will probably go in blast next

month, also the Midvale No. 3 furnace at Coatesville. The Parryville furnace is in. Basic pig iron is scarce and the price tendency is upward. A sale of 2500 tons was being negotiated today on the basis of slightly under \$31, delivered. Some furnaces are not quoting on basic, but where a quotation can be obtained \$29, furnace, is the minimum. The scarcity of steel scrap may force steel companies to use more pig iron. One steel plant which ordinarily uses an all-scrap mixture is buying iron because it cannot obtain sufficient good scrap. No important inquiries for pig iron from abroad have developed, but the trade believes that such business will be negotiated soon, as England is turning down business that is offered by other European countries. One Eastern furnace company has sent a sales representative to England to be on the ground in case any business develops that could be taken care of by American furnaces. Foreign iron continues to come in, last week's receipts totaling 15,182 tons, of which 6358 tons came from England, 5572 tons from France, 3052 tons from Nova Scotia and 200 tons from Belgium. A good deal of the English iron was low phosphorus.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to \$1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$32.14 to \$32.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	33.14 to 33.76
East. Pa. No. 1X.	34.14 to 35.26
Virginia No. 2 plain, 1.75 to 2.25 sil.	33.17 to 34.17
Virginia No. 2X, 2.25 to 2.75 sil.	34.17 to 35.17
Basic delivered eastern Pa.	30.00 to 31.00
Gray forge	30.00 to 31.00
Malleable	33.14 to 33.64
Standard low phos. (f.o.b. furnace) nominal	35.00
Copper bearing low phos. (f.o.b. furnace)	32.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.	
Continental foundry, 1.80 to 2.50 sil.	\$28.50
Continental foundry, 2.50 to 3 sil.	29.50
Low phos., copper free, guar. not over 0.035 per cent phos.	\$30.00 to 32.00
Continental, phos. 1.50; sil. 2 to 3.	29.25 to 29.75

Ore.—Last week's receipts of iron ore from Sweden totaled 7410 tons. A shipment of 4171 tons of manganese ore from South Africa was received here and 31 tons from Germany.

Ferroalloys.—British ferromanganese has been advanced to \$115, seaboard, but none is available for shipment before August. Domestic is firm at \$120, seaboard or furnace, and small lots available for prompt shipment are quoted at \$120 and \$125. Domestic spiegeleisen is quoted at \$40, furnace, for deferred delivery and foreign spiegel in stock here for quick shipment is held at a much higher figure.

Semi-Finished Steel.—Eastern mills will not sell open-hearth rerolling billets at less than \$45, Pittsburgh, while forging billets are quoted by one company at \$52 and by another at \$55, Pittsburgh.

Plates.—Eastern plate mills, with one or two exceptions, continue to quote 2.50c., Pittsburgh, for Eastern shipment, and 2.55c. or higher at mill for shipment to points west. One company is quoting 2.65c., Pittsburgh, for second quarter, and, under pressure from consumers, for third quarter protection has named 2.75c., Pittsburgh, for that delivery. One mill with a substantial backlog has been endeavoring to hold the volume of new tonnage at a rate about equal to current shipments, but finds that it is very easy to let orders run ahead of shipments. A good deal of inquiry comes from the Pittsburgh district because of the fact that mills located there are not able to make as early deliveries as those in the East.

Structural Material.—Building projects in Philadelphia now pending total about 20,000 tons, this including several large jobs such as the Elks building, 4200 tons; the Philadelphia & Reading Terminal at Camden, 4000 to 5000 tons; the Philadelphia Inquirer building, 5000 tons; two apartment houses requiring 2200 tons each and a building for the Young Men's Hebrew Association, 1000 tons. The other jobs making up the total of 20,000 tons are of a few hundred tons each. Structural shapes are 2.50c., Pittsburgh, all Eastern mills now quoting this price and one or two are above that.

Bars.—One large producer of bars which can make deliveries in three or four months has no difficulty in obtaining 2.50c., Pittsburgh, and while no large tonnages are being placed at this figure, there is a steady inquiry for small lots from jobbers and manufacturing consumers who do not complain of the price if they can get satisfactory delivery. The demand for bar iron is increasing as the immediate supply of steel bars diminishes and Eastern bar iron makers have again advanced to 2.50c., Pittsburgh, for carload lots and to 2.80c. for less than carloads.

Sheets.—An Eastern manufacturer of blue annealed sheets quotes 3c., Pittsburgh, as its minimum and has no difficulty in getting this price for eight to ten weeks delivery. Black and galvanized sheets are not easily obtainable for early delivery.

Warehouse Business.—Prices quoted by local jobbers for steel out of stock are as follows:

Soft steel bars and small shapes, 3.30c.; iron bars (except bands), 3.30c.; round edge iron, 3.50c.; round edge steel, iron finish, 1½ x ¼ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ¼-in. and heavier, 3.40c.; tank steel plates, ¾-in., 3.65c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 4.90c.; galvanized sheets, No. 28 gage, 6c.; square twisted and deformed steel bars, 3.40c.; structural shapes, 3.40c.; diamond pattern plates, ¼-in., 5.20c.; ¾-in., 5.40c.; spring steel, 4.80c.; round cold-rolled steel, 4.15c.; squares and hexagons, cold-rolled steel, 4.65c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.50c.; narrower than 1 in., all gages, 5c.; steel bands, No. 12 gage to ¾-in., inclusive, 4.10c.; rails, 3.30c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—The scrap market continues strong with prices advancing. No. 1 heavy melting steel has been sold at \$26, delivered. The prices paid recently by Eastern mills have been relatively higher than those in the Pittsburgh district, but sales of heavy melting steel were made last week to a steel plant at Cumberland, Md., which has freight rates from certain shipping points on a par with those to Pittsburgh, at \$29.50, delivered. The scrap trade believes that the upward movement in steel scrap will continue until it passes the price of basic pig iron, a market development that occurs only once or twice in a decade. The high prices and scarcity of steel scrap have made it possible to import a tonnage from China. Last week 2300 tons arrived here from Cuba.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	\$26.00 to \$26.50
Scrap rails	26.00 to 26.50
Steel rails for rolling	28.00 to 30.00
No. 1 low phos., heavy 0.04 and under	30.00 to 32.00
Cast iron car wheels	27.00 to 28.00
No. 1 railroad wrought	28.00 to 29.00
No. 1 yard wrought	26.00 to 27.00
No. 1 forge fire	22.50 to 23.50
Bundled sheets (for steel works)	22.00 to 23.00
No. 1 busheling	24.00 to 25.00
Mixed borings and turnings for blast furnace use	19.00 to 20.00
Machine shop turnings (for steel works use)	21.50 to 22.50
Machine shop turnings (for rolling mill use)	23.00 to 24.00
Heavy axle turnings (or equivalent)	24.00 to 25.00
Cast borings (for steel works and rolling mills)	22.00 to 23.00
Cast borings (for chemical plants)	25.00 to 30.00
No. 1 cast	29.00 to 30.00
Heavy breakable cast (for steel plants)	26.00 to 27.00
Railroad grate bars	22.00 to 23.00
Stove plate (for steel plant use)	22.00 to 23.00
Railroad malleable	26.00 to 27.00
Wrought iron and soft steel pipes and tubes (new specifications)	22.00 to 23.00
Shafting	28.00 to 30.00
Steel axles	28.00 to 30.00

Two bids have been received for plants of the Standard Parts Co., Cleveland, which will be offered for sale at auction by the receiver March 29 unless private sales are not made before that date. Dan C. Swander, formerly general sales manager, and P. A. Connolly, formerly secretary, have made an offer of \$810,000 for the Perfection Spring plant, Cleveland, and Pontiac spring plant, Pontiac, Mich., and the Cleveland, New York and Boston service stations. The second bid has been made by Burton A. Howe, a Grand Rapids, Mich., attorney, this being an offer of \$1,700,000 for the two spring plants and for the Eaton axle plant.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports	
Old range Bessemer, 55 per cent iron.....	\$5.95
Old range non-Bessemer, 51½ per cent iron.....	5.20
Mesabi Bessemer, 55 per cent iron.....	5.70
Mesabi non-Bessemer, 51½ per cent iron.....	5.05
Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore	
Iron ore, low phos., 55 to 58 per cent iron in dry Spanish or Algerian.....	11.50c.
Iron ore, Swedish, average 66 per cent iron..	9.5c. to 10c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus.....	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian or Indian.....	33c. to 34c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal.....	\$7.50 to \$8.50
Chrome ore, basic 48 per cent Cr ₂ O ₃ , crude per ton, c.i.f. Atlantic seaboard.....	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York.....	60c. to 70c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace per ton.....	\$115.00 to \$120.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid.....	115.00 to 125.00
Spiegeleisen, domestic 19 to 21 per cent, furnace, per ton.....	40.00
Spiegeleisen, domestic 16 to 19 per cent, furnace, per ton.....	39.00
Ferrosilicon, 50 per cent, delivered per gross ton.....	92.50
Ferrosilicon, Bessemer, 10 per cent, per ton furnace.....	47.50
Ferrotungsten, per lb. contained metal.....	90c. to 95c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered.....	11c. to 12c.
Ferrovanadium, per lb. contained vanadium..	\$3.50 to \$4.00
Ferrocobaltitium, 15 to 18 per cent, per net ton.....	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica per net ton f.o.b. Illinois and Kentucky mines			\$20.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica per net ton, f.o.b. Illinois and Kentucky mines.....			21.50
Per 1000 f.o.b. works:			
Fire Clay:	High Duty	Moderate Duty	
Pennsylvania	\$48.00 to \$51.00	\$43.00 to \$46.00	
Ohio	45.00 to 47.00	40.00 to 43.00	
Kentucky	45.00 to 47.00	42.00 to 45.00	
Illinois	48.00 to 50.00	45.00 to 47.00	
Missouri	48.00 to 50.00	38.00 to 43.00	
Ground fire clay, per net ton.....		6.50 to 9.00	
Silica Brick:			
Pennsylvania			47.00
Chicago			52.00
Birmingham			48.00
Ground silica clay, per net ton.....		8.50 to	10.00
Magnesite Brick:			
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....			65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....			40.00
Chrome Brick:			
Standard size, per net ton.....			50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$45.00
Rolling billets, 2-in. and under.....	45.00
Forging billets, ordinary carbons.....	52.00
Sheet bars, Bessemer.....	45.00
Sheet bars, open-hearth.....	45.00
Slabs.....	45.00
Wire rods, common, soft base, No. 5.....	\$47.00 to 50.00
Wire rods screw stock.....	\$5 per ton over base
Wire rods carbon 0.20 to 0.40.....	\$3 per ton over base
Wire rods carbon 0.41 to 0.55.....	\$5 per ton over base
Wire rods, carbon 0.56 to 0.75.....	\$7.50 per ton over base
Wire rods, carbon over 0.75.....	\$10 per ton over base
Wire rods, acid.....	\$15 per ton over base
Skelp, grooved, per lb.....	2.35c. to 2.80c.
Skelp, sheared, per lb.....	2.35c. to 2.80c.
Skelp, universal, per lb.....	2.35c. to 2.80c.

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton.....	\$43.00
Rails, light, new steel, base, per lb.....	2.25c.
Rails, light, rerolled, base, per lb.....	2.25c.
Spikes, ½-in. and larger, base, per 100 lb.....	\$3.15
Spikes, ½-in., ½-in. and ¾-in., base, per 100 lb..	3.75
Spikes, ¾-in., base, per 100 lb.....	3.75
Spikes, boat and barge, base, per 100 lb.....	3.50
Track bolts, ¾-in. and smaller, base, per 100 lb..	\$5.00 to 5.50
Track bolts, ¾-in. and larger, base, per 100 lb..	4.00 to 4.50
Tie plates, per 100 lb.....	2.55 to 2.60
Angle bars, per 100 lb.....	2.75
Bars, common iron, base, per lb.....	2.50c. to 2.60c.
Bars, rail, steel reinforcing, base, per lb.....	2.15c. to 2.25c.
Ground shafting, base, per lb.....	3.20c.
Cut nails, base, per keg.....	\$3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100 (½% Nickel, 10 to 20 per cent Carbon)...	\$3.25
2300 (3½% Nickel).....	5.50
2500 (5% Nickel).....	\$8.00 to 8.25
3100 (Nickel Chromium).....	4.50
3200 (Nickel Chromium).....	6.25
3300 (Nickel Chromium).....	8.50
3400 (Nickel Chromium).....	7.50
5100 (Chromium Steel).....	4.00
5200 (Chromium Steel).....	7.25
6100 (Chromium Vanadium bars).....	5.25
6100 (Chromium Vanadium spring steel).....	5.00
9250 (Silico Manganese spring steel).....	4.15
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium).....	5.25
Chromium Molybdenum bars (0.70-1 Chromium, 0.25-0.40 Molybdenum).....	5.25
Chromium Molybdenum spring steel (0.50-0.70 Chromium, 0.15-0.25 Molybdenum).....	5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100-lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of \$10 per gross ton; on billets smaller than 2½-in. sq. the net ton bar price applies.

Corrosion Tests of Metals in Mine Waters

The results of corrosion tests on 45 different metals and alloys in acid mine waters from coal mines, made in the course of a cooperative investigation of the Carnegie Institute of Technology, the United States Bureau of Mines and an advisory board of coal-mining engineers, are summarized in Bulletin 4 of a coal-mining investigation series, published by the Carnegie Institute of Technology, Pittsburgh.

All alloys tested of the brass type, containing considerable zinc, were corroded extensively by the mine waters. Bronzes, containing considerable tin, were also corroded, but to a less extent than the brasses. Evidently copper-zinc alloys are less desirable for use in mine water than copper-tin alloys. Cupro-nickel alloys were corroded about to the same amount as the brasses. Nickel silver alloys, which contain copper, zinc and nickel, were also corroded extensively. Aluminum alloys showed a tendency to pitting.

The materials which showed a marked resistance

to the corrosive action of the acid mine waters include a high chromium steel, two highly alloyed chromium-nickel-silicon steels, a high-silicon cast iron and a nickel-chromium-iron alloy. All of these materials, except the high silicon cast iron, contain large amounts of chromium. These resistant materials have certain disadvantages for general use in coal-mine equipment, such as the brittleness and hardness of the high-silicon cast iron and the relatively high cost of the others; however, these resistant materials should prove satisfactory for use in pump parts and other equipment where these factors are not a serious consideration.

Economic consideration, such as cost, ease of fabrication and physical properties, will be factors in determining the suitability of a metal or alloy for use in equipment exposed to the action of acid mine water.

Bulletin 4, by W. A. Selvig, assistant analytical chemist, U. S. Bureau of Mines, and George M. Enos, research fellow, Carnegie Institute of Technology, may be obtained from the Carnegie Institute of Technology, Pittsburgh, at a price of 40 cents.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York Straits		Tin		Lead		Zinc	
March	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
14.....	17.12½	16.75	50.00	8.55	8.25	8.20	7.85
15.....	17.12½	16.75	51.50	8.50	8.25	8.25	7.90
16.....	17.25	16.87½	51.25	8.40	8.25	8.30	7.95
17.....	17.25	16.87½	....	8.30	8.25	8.35	8.00
18.....	17.25	16.87½	50.00	8.25	8.25	8.35	8.00
19.....	17.25	17.00	49.25	8.25	8.25	8.35	8.00

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, March 20.

The copper market has again become active and prices have advanced. The tin market is quieter and slightly lower. Lead is decidedly easier and, although zinc is higher, demand is not heavy.

Copper.—After nearly two weeks of a stationary market, electrolytic copper has again advanced to new high levels. Heavy sales have been recorded since Friday, inclusive, for domestic account and prices have steadily advanced until electrolytic copper is quoted today at 17.25c. to 17.37½c., delivered. Sales have been made into the third quarter. The change in the market evidently started in a peculiar manner. It is stated that some speculators about the middle of last week sold the market short and that a counter move by another group followed, driving the market forward, which caused the first group to cover. Most of this manipulation was done under 17c., delivered. Copper consumers, who have been closely watching the market, seemed to scent a new upward swing and started in to buy, thus putting in motion what appears to be a new buying movement. Lake copper is higher at 17.25c. to 17.35c., delivered.

Tin.—With the exception of Wednesday and Thursday, March 14 and 15, the market has been very quiet. On those days there was active buying, mostly by dealers and for London account. Sales on Wednesday amounted to 500 to 600 tons, mostly shipment from the Straits and steamers afloat. On that day the metal was scarce and high, but on the following day there were more sellers than buyers and since then the market has been quiet, approaching stagnation. Spot Straits tin was quoted today at 49.25c., New York. Because of the inactivity here, London prices are lower today than a week ago by about £11 to £12 per ton, with spot standard quoted at £222 17s. 6d., future standard at £223 10s. and spot Straits at £230 7s. 6d. Arrivals thus far this month have been 6117 tons and there is reported afloat 9863 tons.

Lead.—There has been a marked decrease in demand, particularly for prompt and early shipment and prices have eased both here and at St. Louis. April metal is quoted at 8.25c., St. Louis, and 8.25c., New York, at which levels considerable lead is available. The leading interest is a seller at its official price of 8.25c., New York.

Zinc.—This market has experienced a moderate advance, with prime Western quoted today at 8c., St. Louis, or 8.35c., New York, an increase of 15 to 20 points in the week. A moderate demand is reported for April, May and June positions and metal for April shipment seems to be in moderate supply, or at least a little easier than a week ago. Brass special continues scarce and at a price higher than the usual spread above prime Western.

Nickel.—Shot and ingot nickel are quoted at 29c. to 32c., with electrolytic nickel obtainable at 32c., these quotations being those of the leading producers. In the outside spot market shot and ingot nickel are quoted at 29c. to 32c.

Antimony.—The market is considerably easier and spot and early delivery metal in wholesale lots are quoted at 8.75c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted at 24.50c. to 25c. per lb., New York, duty paid by importers of the foreign product, some of these, however, being unable to secure metal from their principals. The leading domestic producer continues to keep its quotations from being made public.

Old Material.—The market is stronger and values have advanced. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	16.50
Copper, heavy and wire.....	15.25
Copper, light and bottoms.....	13.00
Heavy machine composition.....	13.25
Brass, heavy.....	10.00
Brass, light.....	7.75
No. 1 red brass or composition turnings..	12.25
No. 1 yellow rod brass turnings.....	9.50
Lead, heavy.....	7.75
Lead, tea.....	6.25
Zinc.....	5.50

Chicago

March 20.—Copper, tin, zinc and antimony have advanced, while lead has declined. The statistical position of copper is excellent, and while buying is not of extraordinary proportions, the metal is so closely held that any increase in demand is immediately reflected in stronger prices. There have been wide fluctuations in tin during the week, with the present price higher than that last quoted in this column. There has been little demand for lead, and although there is no particular pressure to sell, the market has sagged to the price quoted by the leading producer. Among the old metals lead pipe has declined and tin foil has advanced. We quote, in carload lots, lake copper, 17.50c.; tin, 52.50c.; lead, 8.35c.; spelter, 8.05c.; antimony, 10.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 12.25c.; red brass, 11.75c.; yellow brass, 8.75c.; lead pipe, 6.50c.; zinc, 5c.; pewter, No. 1, 29c.; tin foil, 33c.; block tin, 38c.; all buying prices for less than carload lots.

Milan Meeting of Iron and Steel Institute

An unusual program is announced for the autumn meeting of the Iron and Steel Institute of Great Britain. By invitation of the Italian Metallurgical Association it will be held in Milan, Italy, as stated in these columns on Feb. 8, and the dates are Sept. 17 and 18. The meeting will be followed by visits and excursions to the chief industrial centers of that country from Sept. 19 to Oct. 4, London being reached on the last day. The entire arrangements cover a period of about 20 days, including the departure from London and return to that city.

High Production Rate in Mahoning Valley

Youngstown, March 20.—District iron and steel plants are maintaining production at a maximum rate. The only change of importance this week is the blowing in of the Thomas blast furnace at Niles of the Carnegie Steel Co., which was scheduled for resumption. This furnace, a detached stack, has been idle for a number of years. Its resumption brings the number of active furnaces in the Mahoning Valley to 25 of 26.

Basing Point Hearing Postponed

CHICAGO, March 20.—The hearings in the Pittsburgh basing point case, which were scheduled to be resumed before the Federal Trade Commission at Chicago March 19, were again postponed until March 26.

Hamilton furnace, Hamilton, Ohio, is to be blown in about April 1.

LARGE COAL STOCKS

Supply Has Not Increased Unduly with Greater Activity of Plants

WASHINGTON, March 20.—Incomplete returns from by-product coke and steel plants indicated an increase of about 10 per cent in the tonnage of bituminous coal on hand on Feb. 1, according to a report of the Bureau of Census and the Geological Survey, made under authority of the Federal Fuel Distributor. Owing to the increase in the rate of consumption, these plants had the same supply on hand as on Jan. 21, amounting to 22 days. Steadily increasing activity in the steel industry has been responsible for a rapid increase in stocks of coal at by-product coke and steel plants since the end of the miners' strike on Sept. 1, 1922. It is estimated that the total quantity on hand on Feb. 1 was no less than 112 per cent greater than on Sept. 1. The total stocks held by these two important classes of consumers has now reached a level where it compares favorably with the supply on dates when stocks were largest. The supply on hand Feb. 1 was 16 per cent less than on Jan. 1, 1922, 20 per cent less than on March 1, 1922, and 29 per cent less than on Jan. 1, 1919, when stocks at such plants were at the highest level recorded during the period over which stock statistics extend.

Reports received from 20 by-product coke plants stated that the quantity now on hand from day to day

represents merely a normal working supply. On Feb. 1, 1923, these plants had on hand 145,839 tons of coke. On Jan. 1, the same plants had 212,261 tons and on March 1, 1922, when the accumulation was largest, the quantity of unsold coke was 870,000 tons. A large part of the surplus eventually found its way into the bins of householders as a substitute for anthracite.

On Feb. 1, 1923, commercial consumers had in storage approximately 38,000,000 tons of soft coal. This was 2,000,000 tons more than the stocks on Jan. 1, 1923, and represents a total increase of 16,000,000 tons since Sept. 1, 1922, when mining was resumed in the union fields that had been affected by the strike. Strictly comparable records are not available, but from the data at hand it is obvious that stocks on Feb. 1, 1923, must have been less than on the corresponding date in years for which statistics on stocks exist.

Measured in tons, stocks increased 5.5 per cent between Jan. 1 and Feb. 1. Measured in terms of days' supply, there was a decrease of 7.7 per cent, due to the increase in the rate of consumption in January.

Assuming that the stocks were evenly divided, the supply on Feb. 1 was sufficient to last 24 days, against 26 days on Jan. 1. Such assumption may only be made for comparative purposes, however, for actually stocks are never evenly divided. Some consumers carry reserves far above the average and others have very little coal in storage. The trend of production has been downward during February and it is doubtful whether stocks have increased perceptibly, if indeed there has not been a decrease.

PLANTS VERY BUSY

Pennsylvania Manufacturers Seek More Employees—Only One Dark Spot in State

HARRISBURG, PA., March 20.—The steel industry, the key to production in Pennsylvania, is approaching capacity, while employment managers are making active efforts to obtain labor from every available source. This is the substance of semi-monthly reports for the period ending March 15, furnished to Dr. Royal Meeker, Pennsylvania Commissioner of Labor and Industry.

Common labor, the reports say, is being requisitioned from the South. Skilled workers in every branch of the iron and steel trade, over and above the available supply, are being sought through immigration channels from Canada and England, where unemployment exists, notably in the shipbuilding industry.

Production in some quarters is reported to have reached 90 per cent capacity, with indications that many mills will be operating at capacity by the end of March. Demand for handy men and helpers, indicating the sound condition of the industry, is reported from most iron and steel centers of the State.

Philadelphia reports an especially growing demand. The American Car & Foundry Co., Wilmington, is reported in need of an indefinite number of men familiar with steel passenger coach construction. The General Electric Co., Erie, has sent representatives to Philadelphia in a search for machinists, molders and patternmakers.

Erie reports a demand for all classes of skilled workers. Mills are now operating at 90 per cent, with the expectation that this will be somewhat increased before the end of the month.

Johnstown mills are operating virtually at capacity. Most of them need common labor. Harrisburg reports no unemployment of iron and steel workers or first class mechanics. An increasing demand exists for handy men and helpers. It is impossible to supply all calls for help.

Pittsburgh says lately demand for machinists and metal workers is increasing. The demand for helpers and handy men is heavier. McKeesport reports that employment officials are making heavy demands in order to maintain even present production. Reading has had numerous calls for helpers and handy men. New Kensington needs hot mill workers.

Scranton, the lone employment district in the State

in which conditions are not bright, is still feeling adversely the effects of the railroad shopmen's strike. Most of the strikers are said to have obtained employment, but 3000 of them are still reported without work.

Changes of Personnel in Bureau of Mines

WASHINGTON, March 20.—D. A. Lyon, chief metallurgist and supervisor of stations of the Bureau of Mines, has been appointed assistant director in charge of the research branch, which includes the functions and scope of the former investigations branch after the elimination of leasing matters. Continued growth of the bureau, especially in the supervision of leasing operations on public lands, has made it necessary to create a leasing branch with the bureau, the appointment of another assistant director and to make several changes of personnel within the organization. The changes became effective March 1. A. W. Ambrose, assistant director, has been placed in charge of the leasing branch and will act as consulting engineer to all branches of the bureau on matters relating to petroleum and natural gas. For the present no appointment will be made to the position of supervisor of stations, and Mr. Lyon will perform the duties of supervisor in addition to those of head of the research branch. T. T. Read, having asked to be relieved from his position as chief of the information service, and assigned to investigative work, has been appointed a supervising mining engineer. C. E. Julihn has been recalled from the service as chief mining engineer of the War Minerals Relief Commission and made chief of the information service. Francis Winslow, who has been connected with the Division of War Mineral Supply, has been assigned to serve with the War Minerals Relief Commission as its chief engineer. J. W. Furness, who has been working with the War Mineral Supply Division of the Bureau of Mines has been given a permanent appointment in that division.

May Build Fabricating Shop

BIRMINGHAM, ALA., March 20.—Ernest Creher, head of the Creher shipbuilding interests at Tampa, Fla., has closed for 54 acres of land on the eastern outskirts of Birmingham. It is understood to be the intention to build a fabricating steel shop to fabricate materials to be used in the Florida works. They could be floated down the Warrior river to Mobile and thence moved by coastwise steamer.

FABRICATED STEEL BUSINESS

February Shows Further Increase and About as Much as Last May

WASHINGTON, March 19.—A further increase in sales of fabricated structural steel is reported for February, according to figures received by the Department of Commerce through the Bureau of the Census. February sales amounted to 80 per cent of shop capacity, as against 76 per cent for January. Total sales reported for February by 151 firms, with a shop capacity of 219,955 tons per month, amounted to 176,787 tons, the highest since last May.

Tonnage booked each month by 164 identical firms, with a capacity of 223,355 tons per month, is shown below, together with the per cent of shop capacity represented by these bookings. For comparative purposes, the figures are also prorated to obtain an estimated total for the United States on a capacity of 250,000 tons per month.

	Actual tonnage booked	Per cent of capacity	Estimated total bookings
1922			
April	197,796	89	222,500
May	181,503	81	202,500
June	162,876	73	182,500
July	153,903	69	172,500
August	152,253	68	170,000
September	143,566	64	160,000
October	128,315	58	145,000
November	108,593	49	122,500
December	130,082	58	145,000
1923			
January	168,336*	76	190,000
February	176,787**	80	200,000

*Reported by 161 firms with a capacity of 222,605 tons.

**Reported by 151 firms with a capacity of 219,955 tons.

Inquiries of the Week Over Twice Volume of Awards Which Was Large

Fresh fabricated steel inquiries in the past week involve a total considerably over 50,000 tons, or over twice the volume of an active week in contracting. The awards include:

Kaufman loft building on West Thirty-fifth Street, New York, 1500 tons, to Hay Foundry & Iron Works.

Maine Central bridge at Topshan, Me., 1300 tons, to unnamed fabricator.

Office building, Madison Avenue near Thirty-ninth Street, New York, 1500 tons, to Harris Structural Steel Co.

Straus Building, Chicago, 9000 tons, divided among Morask Construction Co., Vanderkloot Steel Works, Kansas City Structural Steel Works, Minneapolis Steel & Machinery Co., and Lakeside Bridge & Steel Co.

Elks Temple, Indianapolis, 1000 tons, to Central States Bridge & Iron Co.

Willie Apartments, Chicago, 1800 tons, to A. Bolters' Sons. Train sheds, Union Depot, St. Paul, Minn., 264 tons, St. Paul Foundry Co.

Chicago & Northwestern, miscellaneous material, 127 tons, to American Bridge Co.

Wetherbee, Sherman & Co., Port Henry, N. Y., sintering plant, 120 tons, to Lehigh Structural Steel Co.

Baltimore & Ohio, elevator, Locust Point, Md., 2600 tons, to American Bridge Co.

Bridge work, Big Four Railroad, Indianapolis, 600 tons, to Fort Pitt Bridge Co.

Labor Temple, Louisville, 300 tons, to Riverside Bridge Co.

Bridge work, Louisville & Nashville Railroad, Evansville, Ind., 300 tons, to Virginia Bridge & Iron Co.

Sawmill for American-Oregon Lumber Co., Vernonia, Ore., 1400 tons, to Wisconsin Bridge & Iron Co.

Tainter gates and miscellaneous steel for hydroelectric plant for Middle West Utilities Co., Constantine, Mich., 185 tons, to Lakeside Bridge & Steel Co.

Milwaukee Sewage disposal plant, screenhouse, 200 tons, to Worden-Allen Co.

Pawling & Harnischfeger Co., Milwaukee, machine shop addition, 450 tons, to be fabricated by owner.

Bedell Co., Cleveland, store building, 500 tons, to McClintic-Marshall Co.

Ford Plate Glass Co., Toledo, Ohio, factory addition 500 tons, to McClintic-Marshall Co.

Commonwealth apartment house, Cleveland, 1000 tons, to Moss Iron Works.

Transmission towers, Appalachian Power Co., Bluefield, W. Va., 1000 tons, to American Bridge Co.

Two highway bridges for Wayne County, Mich., Road Commission, 400 tons, to American Bridge Co.

Five 1000-ton steel barges for West Kentucky Coal Co., Paducah, Ky., 700 tons, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Catskill water system, New York, pipe line, 10,000 tons,

plate work, T. A. Gillespie Co., New York, lowest bidder at \$2,339,000.

Office and publishing building for the Inquirer, Philadelphia, 5000 tons, George A. Fuller Co., general contractor.

Apartment building, Philadelphia, 1000 tons or more, George A. Fuller Co., general contractor.

Flushing extension of subways, New York City, 7500 tons, bids close April 2.

Boston Edison Co., power house near Boston, 3500 tons. General Electric Co., manufacturing building, Schenectady, N. Y., 1200 tons.

Loft building on West Thirty-seventh Street, New York, 800 tons.

Club building for Westmoreland Club, Richmond, Va., 350 tons.

Baltimore & Ohio Railroad, bridges, 900 tons.

Pacific Mills, Lawrence, Mass., addition to mills located in South Carolina, 2000 tons.

South Street bridge, Wilkes-Barre, Pa., 400 tons. Besse office building, Springfield, Mass., 500 tons.

Oppenheim & Collins Co., store building, Philadelphia, 500 tons.

United States Navy Department, oil storage tanks, Honolulu, 10,000 tons.

Dock sheds, New Orleans, 1000 tons.

Peoples bank building, Marietta, Ohio, 300 tons. Standard Oil Co. of Indiana, tank work, 600 tons.

Columbia Steel Corporation, blast furnace and coke ovens, Provo, Utah, 2000 tons.

Jewish Hospital, St. Louis, 2400 tons.

Interstate Garage, Chicago, 4000 tons.

Bloomfield building, Chicago, 2000 tons.

Federal Reserve Bank building, St. Louis, 2750 tons.

Pure Oil Co., refinery at Smith's Bluff, Tex., tonnage unstated, bids to be taken shortly.

Elks' Club, Milwaukee, 2500 tons, bids extended to March 29 from March 19. W. F. Elchfeld, 208 City Bank Building, secretary executive committee.

Wausau Paper Mills Co., Wausau, Wis., 800 tons, Lackawanna steel piling on concrete dam construction at Brokaw, Wis.

Baltimore & Ohio, elevator, Locust Point, Md., remainder of structural steel, 300 tons to be let by general contractor; bids on general contract to be taken by John S. Metcalf Co., engineer, Chicago, April 10.

General Electric Co., Erie, Pa., addition to power house, 600 tons, bids taken.

Home Savings Bank Co., Toledo, Ohio, bank building, 500 tons.

RAILROAD EQUIPMENT BUYING

Over 8000 Cars Bought and 8200 Added to Those Under Inquiry

Eastern rather than Western car builders seemed to have profited by the awards of the week, which were large, amounting to over 8000 cars. Purchases and inquiries include the following:

The Seaboard Air Line has ordered 1000 box cars from the Pressed Steel Car Co., 800 composite gondolas from the Standard Steel Car Co. and 200 composite gondolas from the Newport News Shipbuilding & Dry Dock Co.

The Louisville & Nashville is in the market for 4000 50-ton hopper cars, 2000 50-ton composite gondolas and 2000 40-ton box cars.

The Baltimore & Ohio Railroad has ordered 25 Santa Fe type locomotives from the Lima Locomotive Co., in addition to the 50 awarded to the Baldwin Locomotive Works, as reported in THE IRON AGE of March 8.

In addition to the 100 Hart convertible cars placed last week, the New York Central has ordered 4000 cars, distributed as follows: 1500 hopper cars and 500 box cars to Standard Steel Car Co.; 1500 box cars to American Car & Foundry Co., and 500 hopper cars to Pressed Steel Car Co.

The Denver & Rio Grande Western is inquiring for 100 narrow gage stock cars.

The Chesapeake & Ohio has let 1000 70-ton coal cars to Standard Steel Car Co. and a like number to another car builder.

Chicago & Northwestern has placed 40 10,000-gal. tank cars with American Car & Foundry Co.

Toledo, St. Louis & Western is inquiring for 100 flat cars of 50 tons capacity.

Illinois Central is in the market for 4 parlor, 2 cafe lounge, 5 dining, 6 horse and 8 baggage cars.

On March 1, 215,552 freight cars or 9 1/2 per cent of the cars on line, were in need of repair, according to the car service division of the American Railway Association. This was an increase of 8967 compared with the number on Feb. 15. Of the total number, 155,813 were in need of heavy repairs, an increase of 2272 since Feb. 15.

PERSONAL

Clifford E. Pierce has purchased the interest of A. B. Betz in the Betz-Pierce Co., jobber in iron and steel, Cleveland, and has succeeded Mr. Betz as president of the company. Mr. Pierce has been vice-president and treasurer. Thomas L. Philpott has been elected treasurer and R. H. Southworth, who has had charge of the sales, has been elected secretary. Two years ago Mr. Pierce and Mr. Betz acquired the outside interests in the company and since then have been its exclusive owners.

R. B. Tripp has been appointed sales manager of the Ohio Forge Co., Cleveland. For the past six years he has been purchasing agent of the company.

John Duncan, president Illinois Co., St. Louis, and Clement Studebaker, son of the late Clement Studebaker, Sr., automobile manufacturer, have been elected directors of the Mississippi Valley Trust Co. Both are directors of the National Enameling & Stamping Co. Mr. Duncan has been associated for many years in the steel industry.

E. B. Lapham, formerly general manager Edgar T. Ward's Sons Co., iron and steel merchant, at Chicago, has been elected vice-president with headquarters at Chicago, to succeed J. S. Winn, retired. W. Bruce Lockwood, formerly director of purchases for the company at Boston, has been appointed general manager at Chicago, to succeed Mr. Lapham.

E. A. Merrill, vice-president and treasurer Minneapolis Steel & Machinery Co., Minneapolis, Minn., has been elected president to succeed George M. Gillette. George L. Gillette has been elected vice-president, and C. Sivright becomes treasurer. J. L. Record was re-elected chairman of the board, and W. C. Rich was re-elected secretary.

Lucien I. Yeomans, industrial engineer, Chicago, has been appointed chief engineer of the A. O. Smith Corporation, Milwaukee, and William Nelson Stevens, formerly identified with the Cincinnati Grinder Co., Cincinnati, and the Gisholt Machine Co., Madison, Wis., has been appointed designing engineer of the Smith corporation.

Charles F. Lederer, who has been connected with the rail welding department of the Metal & Thermit Corporation for more than two and one-half years, has been appointed general supervisor of rail welding to assume full charge of all technical work for that company. He was formerly superintendent of way of the Milwaukee Electric Railway & Light Co., Milwaukee, having served that company for over 12 years in its track department.

Gus W. Wagner, formerly general purchasing agent of the Detroit United Railway, now has charge of the steam and electric railway sales division for the I. M. Jacobson & Sons Co., smelters and manufacturers, 72 Catherine Street, Detroit. His offices will be located at 1011 Majestic Building, Detroit.

L. G. W. Carpenter, who for the past few years has been New York district sales manager for the Penn Seaboard Steel Corporation, Philadelphia, has resigned, effective April 1, and will spend a few weeks in the country for his health. His plans for the future will be announced later.

J. F. Kent, for 10 years general superintendent of the American Cast Iron Pipe Co., Birmingham, Ala., and prior to that time superintendent of the Bessemer rolling mill and rail mill of the Tennessee Co. at Ensley, has gone to Radford, Va., where he will be general superintendent of the two pipe plants of the Lynchburg Foundry Co. at Lynchburg and Radford. Mr. Kent came to Birmingham from Sydney, Nova Scotia, 21 years ago.

William A. Rogers, formerly president of the Rogers-Brown Iron Co., Buffalo, was elected chairman

of the company at the recent annual meeting, when the position of chairman was created. Other officers were elected as follows: President, William S. Rogers; vice-presidents, Hugh Kennedy and C. R. Holzworth; treasurer, David G. Williams, and secretary, Charles H. Byron. The president, a son of William A. Rogers, has been with the company and allied interests 12 years. C. R. Holzworth comes from Granite City, Ill., where he has been general manager of the blast furnace and coke operations of the St. Louis Coke & Chemical Co.

E. H. Worth, formerly vice-president and treasurer of the Worth Steel Co., Claymont, Del., was recently elected president to succeed his father, the late W. P. Worth. W. A. Worth was elected vice-president and treasurer and G. D. Spackman secretary. At the same time Paul M. King and Thomas Y. Moore were elected to the board of directors.

Paul A. Collins, formerly Washington representative of the Automatic Electric Co., has been appointed assistant manager of the P. A. X. department of the North Electric Mfg. Co., Galion, Ohio.

W. A. Hopkins, supply agent since 1911 of the Missouri Pacific Railroad, has been promoted to general purchasing agent to succeed the late Charles A. How. L. P. Krampf has been made supply agent.

J. W. Lawrence has joined Walter Wallingford & Co. in its Pittsburgh office as assistant to George A. Wilson, district manager.

Thomas E. Doyle, president Dravo-Doyle Co., Pittsburgh, and a director of the Dravo Contracting Co., the Enterprise Machine Co., the Poland Coal & Coke Co. and the Ocean Coal Co., recently was named a member of the Pittsburgh Board of Public Education. He was born in Brownsville, Pa., but has lived in Pittsburgh for the past 50 years. He is prominent in business, civic and philanthropic activities.

Prof. Lester B. Breckenridge, chairman of the department of mechanical engineering, Yale University, has announced his intention of retiring at the end of the current term. He is a graduate of Sheffield Scientific School, class of '81, and has been teaching at Yale for the past 14 years, previous to which time he was at the University of Illinois.

Evan M. Jones, general manager of the Harrisburg, Pa., plant of the Lalance-Grosjean Mfg. Co. for the last two and one-half years, has resigned to become general manager of the Parkersburg Iron & Steel Co., Parkersburg, W. Va. He was formerly superintendent of the sheet and jobbing mills of the Bethlehem Steel Co. at Sparrows Point, Md. His resignation became effective March 15, but no successor has yet been appointed.

Clifford F. Messinger, general sales manager Chain Belt Co., Milwaukee, for three years, and member of its board of directors, was elected second vice-president at the annual meeting on March 15. He also is a director of the Interstate Drop Forge Co., Milwaukee.

J. R. Morash, for 20 years associated with General Electric Co. in executive capacities, has been elected secretary and general manager of the Lipman Refrigerator Car & Mfg. Co., Beloit, Wis., the major interest in which has been acquired by a group of Rockford, Ill., capitalists which includes George O. and W. A. Forbes, principal owners of the Rockford Malleable Iron Works.

S. R. Rectanus, director of the personal service division of the American Rolling Mill Co., Middletown, Ohio, has been advanced to assistant manager of the Ashland, Ky., division. He has been with the company since his graduation from Purdue University in 1909. A. K. Lewis, formerly director of safety and labor and more recently associate director with Mr. Rectanus, will succeed to the directorship of the personal service division.

P. K. Reed has been appointed manager of the Chicago office of the R. H. Beaumont Co., Philadelphia. He will be located at 760 Monadnock Block.

A. W. Wyckoff, President Wyckoff Drawn Steel Co., Pittsburgh, has been appointed receiver for the Valley Forging Co., Verona, Pa.

OBITUARY

CHARLES F. CUNO, president Cuno Engineering Corporation, Meriden, Conn., died in his 60th year at Miami, Fla., on March 14. Mr. Cuno was born in Germany, and came to this country when 18 years old. He studied in Wisconsin and became an electrical engineer. In 1906 he went to Meriden to become chief engineer of the large plant of the Connecticut Telephone & Electric Co. of that city, and left it in 1913, when he organized and became active head of the Cuno Engineering Corporation, which grew rapidly in the manufacture of electrical equipment until it became one of the most prosperous industries in Meriden.

EDWARD H. DEAN, president Dean Brothers Steam Pump Works, Indianapolis, died on March 11, aged 80 years. Mr. Dean was born at Deansboro, N. Y., and attended school in New York and Brooklyn. He learned the machinists' trade and when the Civil War broke out he enlisted, serving three years in the United States Navy as an engineer. He entered the foundry and machine business for himself in Rome, N. Y., after the Civil War, but moved with the business to Indianapolis in 1870. He had been president of the company for the past 50 years. Mr. Dean is survived by a widow, three sons and three daughters.

FERDINAND MUMMELTHEY, formerly general superintendent Graham Bolt & Nut Co., Pittsburgh, died at his home in Coraopolis, Pa., on March 14. He was born in Germany in 1855, and came to this country in 1885, locating in Chicago, where he became identified with the McCormick Reaper Co. He severed that connection in 1907 to become general superintendent of the Graham Bolt & Nut Co., then the Graham Nut Co., and held that position until his retirement a few years ago.

GEORGE F. BURTON, aged 81, president G. F. Burton Co., Springfield, Ohio, dealer in pig iron and foundry supplies, died March 15 at his home in that city, after an illness of several months. Mr. Burton formed the company in 1895 and directed its affairs until recently, when ill health prevented. He was born in East Cleveland and went to Springfield in 1876. Mr. Burton's son, Fred R., is secretary of the G. F. Burton Co., and another son, Curtis, is manager of the Mast, Foos Co.

FREDERICK GROTENRATH, founder and president of the American Machinery Co., 103 West Water Street, Milwaukee, died on March 15 at the age of 77. He had been a resident of Milwaukee from infancy. Due to advanced age Mr. Grotenrath relinquished active management several years ago to his sons, George, who is vice-president; Fred J., secretary and treasurer, and Edward W., assistant manager. The business was established under its present name and form in 1900.

FREDERICK H. GOFF, president Cleveland Trust Co., Cleveland, and prominently identified with various industrial activities in that city, died on March 14. He was a director of the National Acme Co. and the White Sewing Machine Co., Cleveland, and of the American Zinc, Lead & Smelting Co.

Complete coal and ashes handling systems for boiler houses are described and illustrated in an attractive 252 page catalog, No. 50, of the R. H. Beaumont Co., Philadelphia. The advantages and arrangement of super-central coal and ash handling systems, the skip hoist for coal and ashes, loaders, track hoppers and rotary car dumpers comprise the first section. The company's coal weigh larry for boilers, the cable drag scraper for storing and reclaiming coal, the details and advantages of different types of bunkers, crushers and gates are taken up in other sections. There are numerous illustrations, which include reproductions of line drawings, detail views of the equipment and many actual installations. Several pages are devoted to engineering data.

Claire Furnace Co. Case Appealed

WASHINGTON, March 20.—The Claire Furnace Co. case has been carried to the United States Supreme Court. Defeated in the Supreme Court of the District of Columbia and in the Court of Appeals of the District of Columbia, the Federal Trade Commission last Saturday was granted its prayer to appeal the case from the latter to the Supreme Court of the United States for final decision, involving the right of the Federal Trade Commission to gather data regarding the cost of production of steel and other information considered of an intimate and confidential character. The ruling obviously will affect all business enterprises and, therefore, it will be awaited with exceptional interest.

It will be recalled that in both the lower courts named permanent injunctions were granted restraining the commission from getting the data it sought from the 22 iron and steel and coke companies.

In seeking permission to appeal the case the commission through its counsel, W. H. Fuller and Adrian F. Busick, presented an assignment of errors which challenged the findings of the courts on every vital point involved in the proceedings. Among contentions made were the following alleged errors made by the court: In not holding that Congress has power to require corporations engaged in interstate commerce to supply any information concerning their interstate commerce which may enable it intelligently and effectively to legislate respecting such commerce; in holding that Congress cannot create an agency for securing such information; in holding that Congress has not power to require corporations engaged in interstate commerce to furnish it with information regarding intrastate commerce and manufacturing operations; and in not holding that the companies are in business primarily for the purpose of selling and shipping products in interstate commerce and that the business of each is a unit and is so interwoven that it is impracticable or impossible to segregate the required information as to interstate and intrastate operations.

Last Step in Acquiring Brier Hill Steel Co.

Title to the assets of the Brier Hill Steel Co., Youngstown, has been acquired by the Youngstown Sheet & Tube Co., which has assumed management of the properties operated by the Brier Hill company at Youngstown, Niles and Warren. In acquiring title, the Sheet & Tube company received a bill of sale and deeds to the property, both real and personal. In turn it gave to the Brier Hill company a stock certificate for 187,606 shares of Sheet & Tube common stock, to pay Brier Hill common shareholders on the basis of four Brier Hill shares for one Sheet & Tube share.

This constitutes the last step in transfer of the properties. The Brier Hill company's general offices in the Stambaugh Building, Youngstown, are being abandoned and will be occupied largely after April 1 by the Newton Steel Co. Meanwhile the Sheet & Tube general offices are also being rearranged.

The deed for the real property of Brier Hill covers 96 printed pages.

Steel Castings Sales Decline

WASHINGTON, March 20.—Sales of commercial steel castings declined about 9 per cent in February, according to reports received by the Department of Commerce through the Bureau of the Census, in cooperation with the Steel Founders' Society, from companies comprising over two-thirds of the commercial-castings capacity of the United States. Total bookings reported in February were 90,152 tons by firms with a capacity normally devoted to commercial castings of 96,900 tons, or at the rate of 93 per cent of capacity, as against January bookings at 106.9 per cent of capacity. Bookings of railroad specialties amounted to 47,879 tons, or 104 per cent of capacity, as against 125 per cent for January bookings. Bookings of miscellaneous castings amounted to 50,307 tons, or 85.8 per cent of capacity, as against 95.1 per cent for January bookings.

BOOK REVIEWS

Cost Accounting Procedure. By William B. Castenholz. Pages 333, 6x9 in. Published by La Salle Extension University, Chicago. Price \$3.50.

The operating expense and fixed charges of a manufacturing plant are recorded in its general accounts. The apportionment of the several items of wages and expenses as they occur, among the several items of the factory work in progress, is the task set for the cost accountant. The totals of the two sets of accounts must be the same, or the cost accountant's work is unworthy of credence. The reconciliation of the two sets of accounts is well treated in the book.

Mr. Castenholz has assembled in his well arranged book the whole of the practice of cost-keeping as it has been gradually developed during the past twenty years. The diagrams and charts showing the relation of the items of cost, burden and fixed charge to the unit costs, or costs of units, are excellent for the purpose of giving the reader the whole relation at a glance. It is easy with their help to follow the presentation as given in the text.

The subject is treated as would be necessary in developing and operating a cost system for a large works, probably for the purpose of the book's use as a text book by the educational institute which is the publisher. For the small factory, the elaborate system and forms would need to be reduced to much lower terms. The discussion in opposition to the inclusion of interest on plant as an element of cost decides nothing. Those accountants who provide for an item of interest on plant investment to be included in their costs are fully aware that this item does not represent an element of a sum paid out for interest to a fictitious creditor, but is in fact an item of profit, to form a part of surplus from which dividends will be declared. If a certain percentage of profit is demanded by the management, there is no surer way of providing for it than by adding a suitable percentage to cost, and making that sum the selling price.

Both table of contents and index are provided, also a list of forms and charts, so that the volume is convenient for reference. S. H. B.

The Fundamental Principles of Purchasing. By H. D. Murphy, with a foreword by L. F. Boffey, editor of the *Purchasing Agent*. Pages 83, 4½ x 7¼ in. Published by the Purchasing Agent Co., 19 Park Place, New York. Price, \$1.50.

The author is purchasing agent of the American Radio & Research Corporation and has put in print what may be taken as the lessons he has learned through experience in purchasing. He has tried, quite admirably, to pass on to other, and perhaps less experienced purchasing agents, some of the things he has learned to do and not to do.

Readers of the trade journals will be interested in Mr. Murphy's comments on the value of such publications to the purchasing agent.

"Almost every known field of industry," he says, "now has at least one such periodical devoted to its interests and each of us should include in our reading schedule those representing the products which we buy in sufficiently large quantities to make an error in judgment of moment to the fortunes of our company."

"While it is true that the base prices of many commodities are given in the publications . . . and at infrequent intervals a review of activities covering perhaps the current year is printed, there are few so authentic that they could be made the basis for contracts, as in the case of THE IRON AGE, for example."

Mr. Murphy also says, "There is still another class of reading which must have the attention of the purchasing agent, and that is advertising. This comes to us in three forms, the advertising sections of the technical and trade publications, the direct-by-mail circularizing, and catalogs, price lists and engineering bulletins. No one, of course, has the time to read literally

every advertisement appearing in the various periodicals, but the practice of arranging them by sections has been adopted by many advertising managers. This helps us to ignore altogether those which have no bearing on our requirements and enables us, by casually glancing through those in which we are interested, to note new sources of supply or pertinent suggestions in the copy of those with whom we are dealing.

"There is an obligation on our part not to slight these advertisements. They are prepared for our especial benefit and if the advertiser finds that the money so spent is bringing no return he will withdraw. Without this income the editor could not continue publication and we would in turn lose the very helpful articles, which could not be broadcasted in any other way, for the mere pittance represented by the subscription price." C. E. W.

Why Manufacturers Lose Money. By Robert Grimshaw. Pages 176. 5x7½ in. Published by D. Van Nostrand Co., New York. Price \$2.

This book consists of an extended tabulation of classifications such as "Financial," "Commercial," "Technical," "Personal," and under each, further lists of plant, personnel and operating items in which losses may occur. The result is an elaborate skeleton, which would form a splendid frame for a monumental work on the subject of management in industry.

The separate bones of the skeleton set up by Mr. Grimshaw are each adorned by the attachment of some terse, lively, witty or slangy verbal illustration, making the book readable and in places even entertaining. The citation of the hundreds of instances of failure to reduce cost or get full output must suggest to every reader dozens, at least, of possibilities for avoiding similar faults in other plants.

Points for special mention are: the hints on the advantage of purchasing agents knowing what and when to buy, and how much ought to be paid; the importance of planning; the sequence of jobs in the factory, revising and rearranging at frequent intervals so as to make the most of every changed opportunity to get work finished; and the many suggestions as to the selection of the most suitable workers, and their retention as members of a congenial shop force and home neighborhood. Undoubtedly, many a plant could get more and steadier work for less total actual cost, by taking an effective interest in the working and home living conditions surrounding its workers, and making whatever investment might be necessary to make such conditions satisfactory, getting large returns on the investment in the shape of more output per dollar paid out.

While the actual ways and means of reducing losses are not in general given in this book, the manner of presenting the various sources of loss does in each case suggest the appropriate remedy. S. H. B.

New Books Received

Mechanical World Electrical Pocket Book, 1923. Pages 389, 3¼ x 6 in.; illustrated. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Price, 1s. 6d.

Success. By Lord Beaverbrook. Pages 113, 5 x 7½ in. Published by Small, Maynard & Co., Boston, Mass. Price, \$1.25.

Labor Turnover in Industry. By Paul Frederick Brissenden and Emil Frankel. Pages 215, 5½ x 8½ in.; numerous tables and charts. Published by the Macmillan Co., 64 Fifth Avenue, New York. Price, \$3.50.

Les Methodes D'Etude des Alliages Metalliques. By Leon Guillet. Pages 503, 6¼ x 9 in.; illustrations 577. Published by Dunod, 47 Quai des Grandes-Augustins, Paris, France. Price, 65 francs.

Bethlehem Long Ago and Today. By Raymond Walters. Pages 159, 5 x 8 in.; illustrated. Published by Carey Printing Co., Inc., Bethlehem, Pa.

Technical Analysis of Steel and Steel Works Materials. By Frank T. Sisco. Pages 543, 6 x 9 in.; illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$5.

Plans of New Companies

The Thiemosi Corporation, 358 Fifth Avenue, New York, recently incorporated with capital stock of \$100,000 to manufacture automotive equipment, will be ready in about two weeks to let contracts for its manufacturing. Its chief product is an ignition system consisting almost entirely of iron and steel parts. The principals are G. E. Stumpp, E. G. Hinzpeter and W. B. Christal.

The Double A Platinum Works, Inc., New York, has been incorporated with a capital stock of \$100,000, to manufacture platinum and other fine metal products. The company is still in the process of organization, but expects to begin operations very soon. The incorporators are L. Smith, Jr., and A. and I. Gelbaum. Address in care of Kleiner & Britwitz, 299 Broadway, New York.

The Doyle-Brown Motor Plane Corporation, 2 Rector Street, New York, recently incorporated with a capital stock of \$500,000 for the purpose of manufacturing airplanes and airplane motors, has been found in default and will suspend all operations. A proposal has been made to liquidate the affairs of the company outside of the courts.

The Parkhurst Forge Co., Inc., 156 East Forty-fifth Street, New York, has been incorporated with capital stock of \$25,000 to manufacture wrought iron products, forgings, etc. The company will specialize in architectural and decorative iron work to be used for construction purposes. Two plants have been leased and are being used in perfecting preliminary plans, but actual operation on a production basis will not begin for about three months. The incorporators are C. O. Basse, L. Woeger and A. Lover.

A syndicate has been formed to take over the radiator, gasket and lubricator divisions of the McCord Mfg. Co., 110 First Avenue, Long Island City. These units are now entirely segregated. The plants are located at Detroit and Wyandotte, Mich., Plymouth, Ind., and Walkerville, Ont., comprising an aggregate floor space of 386,000 sq. ft. Merrill, Lynch & Co., New York, has offered 50,000 shares of the new company's stock at \$37 a share.

The Spridgeon Machine Co., care of M. D. Kopple, 66 West Fortieth Street, New York, recently incorporated with capital stock of \$50,000, will engage in manufacturing textile machinery and parts. The incorporators are J. W. Spridgeon, H. Stern and S. Klotz.

F. Charles Rein & Son, Inc., New York, has been incorporated with capital stock of \$50,000, to manufacture acoustical instruments and parts. The company is now operative, with headquarters at 71 West Thirty-fifth Street. The incorporators are J. M. May, W. B. Solinger and A. J. Piddian.

Johnston & Noesser, 1158 Myrtle Avenue, Brooklyn, recently incorporated with capital stock of \$100,000, to manufacture gas and electric fixtures, states that no manufacturing will be undertaken at the present by the company, its product being made by Rathbone, Sard & Co., Aurora, Ill. The Johnston company specializes in ranges and furnaces. The principals are: W. Johnston, V. Noesser and D. R. Peck.

The Silent Hoist Co., 302 McDougal Street, Brooklyn, has been incorporated with capital stock of \$25,000 to take over the active business by the same name which has manufactured hoisting machinery, engines, etc., for some time. Operations will be continued as formerly, with no change in personnel. The incorporators are C. M. O'Keefe, J. W. Wunch and T. A. Manning.

The Economy Ice Machine Co., Memphis, Tenn., capitalized at \$250,000, will engage in the manufacture of electric driven ice and refrigerating machines. Plans for future operation are now being developed.

The Pottstown Cement Block Co., Pottstown, Pa., has been organized to manufacture concrete blocks, copings, sills and other building material. The principals are: S. D. Brown and George Gerhardt.

The Middlesex Lighting Fixture Co. Perth Amboy, N. J., recently incorporated with capital stock of \$100,000, has acquired the assets of the Perth Amboy company formerly conducted under the same name. Business will be continued along the established lines, and no expansion is being contemplated at this time. Address Leo Goldberger, 117 Smith Street, Perth Amboy.

The Katalite Corporation, recently organized as chemical engineer, has headquarters in the Woolworth Building, New York, and plant at 99 Hanson Place, Brooklyn, N. Y. The company's product is designed to increase engine efficiency through a catalytic agent which, it is claimed, makes combustion more complete. The management seeks to operate through manufacturers. J. A. Machado, Jr., is secretary.

The American Tool & Mfg. Works, 652-654 West Lake Street, Chicago, has been organized as designer and manufacturer of special machinery, dies, jigs, fixtures, screw machine and punch press products. Arthur B. Cochrane, presi-

dent of the company, was formerly district sales manager of the Steel & Tube Co. of America. He has bought the plant and equipment formerly owned by the Screw Machine Products Corporation, the Standard Clutch Control Co. and W. I. Denny. Robert Hofstetter, formerly engineer with the Illinois Tool Works, Chicago, and the Nash Motors Co., Kenosha, Wis., will be affiliated with the company.

The Owners' Engineering Corporation, 2107 Broadway, New York, recently incorporated with a capital stock of \$100,000, will establish automobile service stations at several important centers. The organization is an outgrowth of the Automobile Club of New York and all services will be rendered at cost to members. Its Manhattan station is located at 509 West Fifty-sixth Street and is equipped to serve passenger cars only. The company is looking for larger quarters to handle the work on trucks. Eventually all plants will be equipped to do every operation in car repairing. The principals are: Paul Archibald and O. A. Martini.

Iroquois Steel Co., Inc., Reorganized

The Iroquois Steel Co., Inc., which had been a personal service corporation, has been reorganized to continue the sale of various steel products and also to operate the plant built by the Fulton Steel Corporation at Fulton, N. Y., and afterward taken over by the Ontario Electric Steel Co. The entire property has been purchased by the Iroquois Steel Co., and actual operations will commence in a few weeks. It covers about seven and one-half acres within the city of Fulton. The main building is of modern steel frame construction, 305 x 100 ft.

The following officers have been elected: President, Alexander MacInnes, formerly vice-president and general manager of sales, Hammond Steel Co. and MacInnes Steel Co., vice-president and general manager of sales, William Breeden, formerly with the Carnegie Steel Co., and more recently general manager of sales Lackawanna Steel Co.; second vice-president, Frank G. Davis, formerly assistant general manager of sales, Atlas Crucible Steel Co., who will be in charge of sales in the Buffalo territory; secretary, S. M. Wetmore, in charge of sales in the Detroit territory, formerly general superintendent Carbon Steel Co.; treasurer, Paul A. MacInnes. Harold B. MacInnes, and Henry Thompson are the additional directors. Mr. Thompson, who was formerly with the Hammond Steel Co. will be the new general superintendent.

The general offices will be at the plant at Fulton, N. Y., and district offices will be maintained in Buffalo, Detroit and Cleveland as heretofore, with additional sales offices to be opened in the larger Eastern cities in the near future.

The reorganized company will manufacture and sell tool, alloy and cold-drawn steels, in billets, bars and shapes, also open forgings including rings, discs, die blocks, etc., and special steels and forgings.

Mahr Mfg. Co. Changes

The Mahr Mfg. Co., Minneapolis, has made the following changes: W. H. White, eastern representative at 56 Murray Street, New York, resigned to accept the district management of the Atlas Steel Corporation at Cleveland, and John O. Connolly, who was graduated in 1910 from Harvard School of Engineering, succeeds him. Philadelphia has been made a branch district and is in charge of E. F. Plea, a graduate of the Delaware School of Engineering with a year's post graduate work at the Carnegie School of Technology, who for several years has been assistant to A. C. Davis, superintendent of motive power for the Pennsylvania Railroad at Wilmington, Del. He will be located at 527 Commercial Trust Building. Harold Rosendahl, graduate engineer of the University of Minnesota, who has been working in the sales department at the home office has been promoted to district manager at Pittsburgh, 239 Oliver Building. The Baltimore office, formerly connected with the Philadelphia and New York territories, has been made a separate district in charge of Jacob Ebert with office at 423 Courtland Street. Buffalo and Cleveland have been given direct representation with the home office, the former in charge of J. Leo Scanlon, graduate engineer of the University of Iowa, with office at 950 Ellicott Square; and the latter in charge of A. D. Fishel, 1202 Illuminating Building, who is a graduate of Case School of Applied Science. J. L. Edwards, for the past four years district engineer for the Mahr company, with headquarters at Pittsburgh, has resigned to become district manager of the Pittsburgh territory with offices in the Oliver Building, for F. J. Ryan & Co., industrial heating equipment specialist, Wesley Building, Philadelphia. He has been active in the design, installation and sale of steel plant equipment in the Pittsburgh district for nearly 10 years, having been associated previously with the Westinghouse Electric & Mfg. Co. and the Fairbanks Co.

NEW TRADE PUBLICATIONS

Graver Zeolite Water Softener.—Graver Corporation, East Chicago, Ind. In Bulletin 509 of 8 pages, $8\frac{1}{2}$ x 11 in., are described the use and equipment for the use of hydrated silicate of aluminum combined with an alkali or an alkaline metal, for the purpose of softening water for boiler or manufacturing purposes. The industries in which this equipment would be useful include laundries, bleacheries, cotton, silk and woolen mills, dye houses, paper mills, tanneries and chemical plants, sugar refineries, ice plants and bottle works, etc.

Combustco Ash Conveyor.—Combustion Engineering Corporation, New York. A 12-page pamphlet, $8\frac{1}{2}$ x 11 in., describing an ash conveyor which receives the ashes under water with a complete seal, and then conveys them into a hopper from which they may be discharged into railroad or industrial cars for final removal. Details are shown by halftones and drawings. This system is said to dispense with manual labor, to quench the ashes at once, and to avoid dust, fumes and heat in the ash tunnel.

Turbines.—De Laval Steam Turbine Co., Trenton, N. J., leaflet, $8\frac{1}{2}$ x 11 in., eight pages, devoted to equipment for textile mills. An installation of a turbine of special design, at the Norwich plant of the U. S. Finishing Co., is illustrated and described in detail.

Gear Grinding.—Lees-Bradner Co., Cleveland. Catalog of 16 pages, referring particularly to a development in the automobile field—a quantity production process for finishing spur gears after hardening. The process is claimed to establish new standards of accuracy and to assure gears that are quiet running. The development of the No. 10 Lees-Bradner gear grinder for finished grinding of spur gear teeth is outlined, and considerable technical data are included. It is claimed that with the adoption of the process spur gears may be used for many purposes where the necessity of eliminating noise and vibration has heretofore made it necessary to adopt other types of drives. Under the process the gear is hobbled in one cut, allowing about 0.003-in. on each side of the tooth for grinding, then hardened, then chucked to grind the bore, and finally mounted on arbor for grinding the teeth, the profile being generated to a involute curve.

Mechanical Stoker.—The United Machine & Mfg. Co., Canton, Ohio. Catalog of 32 pages, explaining the leading features of the Harrington stoker and illustrating essential parts. Illustrations also show installations.

Flanging and Bending Presses.—Morgan Engineering Co., Alliance, Ohio. In a 24-page bulletin, No. 26, $8\frac{1}{2}$ x 11 in., are illustrated 21 presses, for various purposes, built to do special jobs in various industries. Nearly all of these are hydraulic, but a few are motor-driven. The main items of specifications are given, including in each case the capacities of the various rams, both horizontal and vertical. The presses include not only flanging and bending units, but also straightening, stamping and forging presses, and a few for other special work.

Coke Plant Electrical Equipment.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Leaflet 1867 describes electrical equipment for coke plant machinery. Illustrations of the uses of the equipment in by-product plants are shown and recommendations given as to the various types to be used.

Centrifugal Pumps and Pumping Units.—Allis-Chalmers Mfg. Co., Milwaukee. A 60-page catalog, $8\frac{1}{2}$ x 11 in., devoted to centrifugal pumps of all types, with their details and driving units. There is a wealth of illustration, both photographic and diagrammatic, while six pages of tables show capacities of the various units, as well as friction losses. Pumps included in the tables range from 30 gal. per min. to 6500 gal. per min. capacity, while the friction tables cover pipe from 2 in. to 30 in. diameter. Various industrial and other applications of the pumps are given special attention, particularly with relation to power plant use.

Asbestos.—Pennsylvania Asbestos Co., Philadelphia. Ten page booklet, 4 x 6 in. Mention is made of the various products of the company and a page devoted to the history of asbestos.

Calendar.—Helne Boiler Co., St. Louis. Complete size 18 x 24 in. Bottom section contains calendar arranged with the current month, preceding and following month

on each page. Upper part is an attractive reproduction of large boiler room.

Calendar.—Osborn Mfg. Co., Inc., Cleveland. Size 14 x 18 in. Calendar from March, 1923, to Feb., 1924, with months on the lower half of each page. The printing is white on black. On the upper half of each page actual foundry views showing the production of various types of work on equipment made by the company, are given. Calendars for 1922 and 1924 are included on a separate page.

Electric Motors.—Wagner Electric Corporation, St. Louis. Bulletin No. 131 describing the company's single-phase repulsion induction motors, with instructions for ordering and adjusting repair parts. Connections for higher or lower voltage stamped on the name plate are shown and numbers and illustrations of various repair parts given. Size 15 pages, 8 x $10\frac{1}{2}$ in.

Internal Grinders.—Greenfield Tap & Die Corporation, Greenfield, Mass. Bulletin No. 101, 20 pages $8\frac{1}{2}$ x 11 in. A well arranged and fully illustrated presentation features of the Hydroll internal grinding machines Nos. 51 and 52, for accurate work on a production basis. The construction of the machine is taken up in detail and samples of the work given. Foundation plans, details and specifications are included.

Drills, Taps and Dies.—Greenfield Tap & Die Corporation, Greenfield, Mass. Bulletin No. 2 describes drills, taps and dies used by manufacturers of lighting fixtures. A chart showing drills, taps and dies for pipe threads and fine threads for brass tubing is included, it being also available mounted on cardboard. Size 6 x 9 in. 12 pages.

Cast Iron Doors.—Conveyors Corporation of America, 326 West Madison St., Chicago. Folder describing non-warping air-tight door for coke ovens, ash pits, core ovens and other uses. It is available in five sizes, from 15 x 16 in. to 24 x 36 in.

Railway Track Equipment.—Morrison & Risan Co., Inc., Buffalo. Bulletin, $5\frac{1}{4}$ x $8\frac{1}{2}$ in., eight pages, entitled "Howdy," published monthly. Contains an inspirational editorial, anecdotes, and lists of equipment offered by the company.

Gas Producer Type L.—Wellman-Seaver-Morgan Co., Cleveland. In Bulletin 77, February, 1923, 16 pages, $8\frac{1}{2}$ x 11 in., are devoted to a new gas producer based upon the design of the Hughes producer, but with improvements tested out both in the shop and in service. Claims for this new producer are increased mechanical efficiency and gas making capacity, more uniform gas quality, lack of clinker and of hand poking, and a reduced cost of maintenance. The bulletin is illustrated by diagrams and photographs and contains tabular matter relating to the operation of the producer.

Refractory Concrete Linings.—Quigley Furnace Specialties Co., 26 Cortlandt Street, New York. An 8-page pamphlet describes Mono-line and the advantages from its use in lining and patching cupolas, ladles, converters, pit furnaces, tilting crucibles and open-flame furnaces.

New Book Received

Metals and Their Alloys. By Charles Vickers. Pages 760, $6\frac{1}{4}$ x $9\frac{1}{4}$ in.; illustrations, 108. Published by Henry Carey Baird & Co., 2 West Forty-fifth Street, New York. Price, \$7.50.

American Society for Testing Materials: Index to Proceedings. Pages 189, 6 x 9 in. Published by American Society for Testing Materials, 1315 Spruce Street, Philadelphia. Price, \$2.50.

Practical Factory Administration. By Matthew Porosky. Pages 244, $5\frac{1}{2}$ x 8 in.; illustrations, 42. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$2.50.

The Petroleum Register. Directory and statistical record of the world's petroleum industry. Pages 431, $8\frac{1}{2}$ x $11\frac{1}{2}$ in. Published by Oil Trade Journal, Inc., 350 Madison Avenue, New York. Price, \$10.

Accurate Tool Work. By C. L. Goodrich and F. A. Stanley. Pages 300, 6 x 9 in.; illustrations, 327. Published by McGraw Hill Book Co., 370 Seventh Avenue, New York. Price, \$3.

Tables Annuelles de Constantes et Données Numériques. Volume 4, Parts 1 and 2. Pages, Part 1, 626; Part 2, 1377. Published by Gauthier-Villars et Cie., Paris, and the University of Chicago Press, Chicago. Price, \$13.25 each part.

Machinery Markets and News of the Works

LARGE BUYING OF TOOLS

Increasing Number of Important Purchases by Industrial Companies

Some Let-up the Past Week in General Run of Business—More Price Advances

Although there has apparently been some let-up in the past week in the volume of current orders for machine tools, the trade feels greatly encouraged by the quantity of business that has been placed since the first of the year. During recent weeks, there has been large buying by a number of important companies in the automobile and industrial field, and while railroad buying has not kept up the pace of recent months, there is still a considerable volume pending and in prospect.

Automobile companies continue to expand in preparation for what is expected to be the record-breaking year in automobile production. Dodge Brothers, Detroit, have been large buyers of special automatic machines, their orders with one company totaling close to \$200,000. The Stearns Co., Cleveland, has begun to buy shop equipment on a generous scale, its requirements being placed at 75 to 100 machines. One order from this company for 12 milling machines went to a Cincinnati builder.

The largest railroad buying of the week has come from across the border, the Canadian National Railways having bought about 95 machines costing around \$500,000, the bulk of the business being placed with American tool builders. The Canadian Pacific Railroad is expected to come into the market soon with sev-

eral lists for its various shops. Industrial buying in Canada is also improving greatly. Railroad buying in this country consists mostly of scattered orders of no great size, but there are numerous inquiries pending. The Union Pacific has added a half dozen large machines to its recent inquiries at Chicago and the Rock Island is inquiring for several tools. The Louisville & Nashville is in the market again for a number of tools for its various shops. In the railroad equipment field, the Baldwin Locomotive Works is the most prominent buyer. Among its orders last week was one for several planers.

The General Electric Co., Schenectady, N. Y., placed orders last week totaling \$50,000 to \$75,000 and other industrial buyers include the Remy Electric Co., Anderson, Ind., which bought 12 special machines; the J. A. Fay & Egan Co., which continues to look for tools for its new plant at Oakley, Cincinnati; the American Spiral Pipe Works, the Hurley Machine Co., both of Chicago; the Standard Oil Co. of New Jersey, the Sinclair Refining Co.; the Galion Iron Works & Mfg. Co., Galion, Ohio, which is buying mostly used tools; the Snow plant of the Worthington Pump & Machinery Corporation at Buffalo; the Johns-Manville Co., which wants a half dozen tools for its plant at Waukegan, Ill., and the Ideal Electric & Mfg. Co., Cleveland.

Price advances continue. A large manufacturer of milling machines has announced new prices 10 per cent or more above former quotations and a manufacturer of grinding machines has put into effect similar advances. Sheet and metal machinery, upright drills, punch press and other machines have also been advanced by some makers.

New York

NEW YORK, March 20.

SCATTERED buying of machine tools, ordinarily in lots of one to a half dozen machines, is growing in volume and dealers report that March business will show a very good aggregate. Though the demand for new tools has improved, the recent price advances are causing some manufacturers to turn again to used tools. An instance of this is the purchasing of the Galion Iron Works & Mfg. Co., Galion, Ohio, which had its works manager, O. L. Bradley, in New York last week looking over a number of used tools. The Galion company has bought considerable equipment, a large proportion of which is used. The General Electric Co., Schenectady, N. Y., has been a large buyer of new tools, its purchases in the past week totaling \$50,000 to \$75,000. The Baldwin Locomotive Works, Philadelphia, is carrying out its buying program and last week placed orders for a number of planers and other tools. The Snow plant of the Worthington Pump & Machinery Corporation at Buffalo also continues in the market. The Johns-Manville Co., New York, is buying about half a dozen tools for its plant at Waukegan, Ill. The Standard Oil Co. of New Jersey has bought two 6-ft. radial drills. The New York, New Haven & Hartford has placed orders for a few machines on its recent list. The Delaware, Lackawanna & Western Railroad, which

recently inquired for six or eight tools for its Buffalo shops, is expected to place orders shortly.

The market on cranes in this district is extremely active, with numerous inquiries current on electric and hand power overhead cranes and locomotive cranes. Day & Zimmerman, Philadelphia, are receiving bids on some single I-beam, underhung transfer cranes for the American Type Foundry, Elizabeth, N. J. The American Locomotive Co., which recently purchased a 10-ton overhead traveling crane from the Shaw Electric Crane Co., is receiving bids on a 150-ton and a 20-ton overhead traveling crane for its Cooke works at Paterson, N. J. The Ice Service Co., 68 Ninth Avenue, New York, is reported as about to issue an inquiry for some small cranes. The Bethlehem Shipbuilding Corporation, Sparrows Point, Md., is stated to be receiving bids on shipyard cranes and the Bethlehem Steel Co., which recently bought two 20-ton electric cranes is receiving bids on a 50-ton overhead crane. The Union Pacific Railroad, Chicago, has purchased a 200-ton, 78-ft. span overhead traveling crane and the Baldwin Locomotive Works has closed on two 10-ton electric traveling cranes.

Among other recent purchases are:

Phoenix Utility Co., 61 Broadway, New York, a 60-ton, 80-ft. span overhead traveling crane from the Whiting Corporation. This leaves one crane, a 65-ton gantry, still to be awarded by this company;

Bishop, Friedman & Bergstrom, 165 Broadway, New York, a 10-ton and a 5-ton crane for the Ludlum Steel Co., from the Cleveland Crane & Engineering Co.;

Boston & Maine Railroad, two 10-ton, 42-ft. span, 3-motor, overhead traveling cranes for Concord, N. H., shops, from the Whiting Corporation;

Billingham Co., Kalamazoo, Mich., a 1-ton, 15-ft. span underhung hand power crane from the New Jersey Foundry & Machine Co.;

Essex Ice & Cold Storage Co., Newark, N. J., a 1-ton, 30-ft. span, motor-driven crane from the New Jersey Foundry & Machine Co.;

New York, New Haven & Hartford Railroad, a 270-ton transfer-table from the Whiting Corporation;

Charcoal Iron Co., Newberry, Mich., a 10-ton, 46-ft. span, 3-motor overhead traveling crane for Marquette (Mich.) plant and a 4-ton, 2-motor monorail hoist with 46-ft. span transfer bridge, from the Northern Engineering Works;

The Standard Foundry Co., Buffalo, N. Y., purchase reported last week, bought a 5-ton, 69-ft. span, 3-motor, overhead crane from the Northern Engineering Works;

James A. Lenihan, stone yard, Rider Avenue and 149th Street, New York, has purchased a used 5-ton electric crane;

The Denver & Rio Grande Railroad, Denver, Colo., a pile driver from the Industrial Works;

Illinois Central Railroad, a 150-ton wrecking crane from the Industrial Works;

Chicago & Eastern Illinois Railway Co., Chicago, a 120-ton wrecking crane from the Industrial Works;

City of Providence, R. I., a 75-ton, 50-ft. boom locomotive crane from the Brown Hoisting Machinery Co.;

Koopers Co., Pittsburgh, six 25-ton, locomotive cranes from the Industrial Works.

The Boston Stove Foundry Co., which is erecting a new plant at Reading, Mass., has awarded the furnishing of all foundry equipment to the Whiting Corporation.

The American Brake Shoe & Foundry Co., building a new foundry at Portsmouth, Va., has awarded the contract for furnishing equipment to the Whiting Corporation.

The London Steam Turbine Co., 50 Church Street, New York, will take bids early in May for a new plant at Watervliet, N. Y., consisting of three buildings, including power house, estimated to cost \$150,000, with machinery.

The Progressive Die Cutting Co., 204 Greene Street, New York, is making inquiries for shearing equipment, from 30 to 60 in.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, will build a seven-story electric generating plant, 91 x 103 ft., on Locust Avenue, near 139th Street, Bronx, to cost \$750,000, with machinery. Thomas E. Murray, 55 Duane Street, is architect. Frank V. Smith is vice-president.

A manual training department will be installed in the proposed junior high school to be erected at Amsterdam, N. Y., on site in rear of the present high school, estimated to cost \$300,000.

The Lever Lock Rim Co., 41 East Forty-second Street, New York, is in the market for two No. 11 Pratt & Whitney drill presses, immediate delivery; rectangular head, 16 spindles $\frac{1}{2}$ -in.; power feed and oiler complete. C. L. Driggs is in charge.

The F. L. Smithe Machine Co., Eleventh Avenue and Twenty-first Street, New York, manufacturer of paper and envelope machinery, has awarded a general contract to the Ettinger Contracting Co., 44 Court Street, Brooklyn, for a five-story plant at Twelfth Avenue and Forty-fourth Street, to cost \$210,000. Walter M. Cory, 30 Church Street, is engineer.

The Long Island Railroad Co., Jamaica Office Building, Jamaica, L. I., George Kefer, purchasing agent will take bids until March 29 for 38,000 galvanized carriage bolts and 25,000 galvanized lag screws, as set forth in Contract 45.

The Government of Australia will receive bids until April 10 for 700 tons of bronze wire and 1900 tons of copper wire for the Post and Telegraph Department. Specifications and tender forms are at the office of D. B. Edwards, official secretary in charge of the office of the Australian Commissioner, 44 Whitehall Street, New York.

The Adirondack Paper Corporation, Albany, N. Y., recently organized, has leased the mill of the Island Paper Co., at Ballston Spa, N. Y., and will take immediate possession. Extensions and improvements will be made, including equipment installation, and the plant placed in full operation. The company is headed by B. G. MacDonald, Albany; L. C. Case and F. B. Oldham, Newtonville, N. Y.

Henry Rettinger, Long Island City, machinist, has purchased the building on Tenth Street, heretofore held by Charles Tatham, and will use the structure for a general machine shop.

The Iroquois Steel Co., recently organized, will take over the plant of the Fulton Steel Corporation, Fulton, N. Y., lately occupied by the Ontario Electric Steel Co. The new company will expand and improve the works. It is headed

by William Breeden, Frank G. Davis, S. M. Wetmore and Alexander MacInnes.

The George Haiss Mfg. Co., 141st Street and Rider Avenue, New York, manufacturer of portable belt conveyors, wagon loaders, etc., has filed plans for a two-story addition, 100 x 102 ft., to cost \$35,000.

Charles G. Schwartz, 217 Centre Street, New York, manufacturer and dealer in machinery, motors, etc., has acquired the former seven-story factory of F. G. Smith, Inc., manufacturer of pianos, at 774-82 Fulton Street, Brooklyn, at a bankruptcy sale. The new owner will use the property for expansion.

The Common Council, Saranac Lake, N. Y., plans the installation of a new electrically-operated pumping unit at the municipal waterworks.

The New York Edison Co., 130 East Fifteenth Street, New York, will commence the erection of a five-story power house, 58 x 182 ft., on Canal Place, near 140th Street, to cost \$250,000. William Whitehall, 709 Sixth Avenue, is architect.

The Studebaker Corporation, 1700 Broadway, New York, has plans nearing completion at the office of the W. S. Ferguson Co., 1900 Euclid Avenue, Cleveland, engineer, for a six-story factory branch, with parts and service departments, 175 x 200 ft., on West 131st Street, to cost in excess of \$300,000.

The Todd Shipyards Corporation, 25 Broadway, New York, has acquired waterfront property at New Orleans for a new shipbuilding and repair plant, estimated to cost \$2,500,000. A drydock and a power house will be built.

The Reuther Foundry Co., Harrison, N. J., has been organized with a capital of \$500,000, of which \$100,000 has been paid in, to take over and succeed to the foundry and business of Reuther Brothers, Seventh and Bergen Streets, specializing in the production of grey iron castings. The new organization will expand the business to include the manufacture of cast iron pipe and other metal products. It is headed by Frederick, Frank and Francis Reuther.

Plans for a new high school, with vocational department, estimated to cost \$500,000, have been authorized by the Board of Education, Ocean City, N. J., and work will commence at once.

The Wright Aeronautical Corporation, Paterson, N. J., is planning the erection of an addition to its local plant, heretofore devoted exclusively to the manufacture of airplane motors and parts. The new structure will be equipped for the production of complete aircraft and will cost in excess of \$100,000. F. B. Rentschler is president.

The New Jersey Power & Light Co., Dover, N. J., has acquired the plant and properties of the Hackettstown Electric Light Co., Hackettstown, and will take immediate possession. Extensions and improvements will be made for increased power supply.

The A. B. See Elevator Co., Jersey City, N. J., has been organized under Delaware laws, with capital of \$2,700,000, to take over and extend the plant and business of the A. B. See Electric Elevator Co., Pacific Avenue. Alonzo B. See heads the new company.

A manual training department will be installed in the two-story and basement high school, 125 x 125 ft., to be erected at Bogota, N. J., estimated to cost \$225,000, for which bids will be received late in April or May 1. C. V. R. Bogert, 167 Main Street, Hackensack, N. J., is architect.

The Central Jersey Power & Light Co., Morristown, N. J., has been incorporated under State laws, with capital of \$2,000,000, to take over and merge the properties of the Commonwealth Electric Co., and the Morris & Somerset Electric Co., operating at Morristown, Summit and vicinity. Extensions and improvements will be made in the power plants and system, including the installation of additional equipment.

George C. Bergen, purchasing agent, Board of Freeholders, Court House, Newark, N. J., will receive bids until April 10 for a steam boiler and auxiliary apparatus to be installed at the power house at the Essex County Sanatorium, Verona, N. J., as per plans and specifications prepared by Runyon & Carey, 845 Broad Street, engineers.

The Stern Mfg. Co., 72 Tichenor Street, Newark, manufacturing jeweler, is in the market for a foot press, either Chapman or Ruesch type.

The Newark Wire Cloth Co., 224 Verona Avenue, Newark, will commence the erection of a one-story addition, 100 x 309 ft., to cost \$50,000.

The Board of Education, Kearney, N. J., will receive bids until March 26 for manual training equipment for a department in the new high school now under construction. Guilbert & Betelle, 546 Broad Street, Newark, are architects.

A manual training department will be installed in the new high school to be erected by the Board of Education, Milville, N. J., for which bids will soon be asked, estimated to cost \$350,000.

New England

BOSTON, March 20.

GOOD sales of used milling machines, shapers, upright drills, lathes and miscellaneous other tools, together with scattering new equipment running in size up to large boring mills, give the machine tool market in this district a more active appearance. Aside from purchases of new equipment, including 17 small milling machines, four or five lathes of one make, cutter grinders and other tools, representing duplication of machinery now in use by a manufacturer of textile machinery, individual sales were in small lots the past week. The aggregate, however, is encouraging. The best feature of the market is the volume of business apparently to be closed within a short time. Of this prospective business, purchases contemplated by an eastern Massachusetts manufacturer are the most important, involving boring mill equipment, the individual cost of which runs far into five figures, 10 1½-in. turret machines, four lathes, more or less special, and miscellaneous single purpose and high cost tools. Other inquiries, individually small, concern practically all kinds of machine tools, both new and old, with lathe, screw and threading machines perhaps leading.

Among the sales of small equipment reported the past week, that of 10 ½-ton hoists as well as power hack saw equipment to a cotton mill is, perhaps, the most important. A material increase in the demand for small tools is noted.

The Winsted Hardware Mfg. Co., Winsted, Conn., has let contract for a one-story, 44 x 146 ft. addition, work to begin as soon as weather conditions permit.

Sketches are being made for the Foxboro Co., Foxboro, Mass., gages, etc., for a proposed four-story 66 x 160 ft. and 56 x 60 ft., additions.

The Maine Central Railroad has asked bids on a one-story, 100 x 110 ft. car repair shop, costing approximately \$50,000, to be erected at Rumford, Me.

The General Electric Co., Pittsfield, Mass., has awarded a contract to the Austin Co., Philadelphia, for a second addition at its local plant, two-stories, 48 x 80 ft., estimated to cost \$40,000. The same contractor has walls up to the second floor on another extension, 50 x 100 ft., to cost \$150,000, with equipment.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until April 3 for seven steam flow meters for the Boston Navy Yard, schedule 625.

A manual training department will be installed in the proposed three-story high school, 75 x 150 ft., to be erected at Gorham, N. H., estimated to cost \$160,000, for which an architect will soon be selected.

The M. F. Williams Co., Providence, R. I., manufacturing jeweler, will commence the erection of a one-story plant, 50 x 160 ft., on Manucentre Street, with L-extension, 30 x 50 ft., for machine and fine metal-working.

The Department of Public Buildings, 504 City Hall, Boston, has plans for the erection of a municipal service and machine repair shop for city automobiles, on Albany Street, estimated to cost \$150,000.

Jenkins Brothers, 80 White Street, New York, and 510 Main Street, Bridgeport, Conn., manufacturers of valves, steam specialties, etc., are taking bids on a general contract until March 30 for an addition, estimated to cost \$250,000. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects and engineers.

J. C. Doran & Sons, Chestnut Street, Providence, R. I., manufacturing jewelers, have awarded contract to the C. I. Bigney Construction Co., 357 Westminster Street, for a two-story addition on Elbow Street.

A manual training department will be installed in the three-story junior high school to be erected at Metuhen, Mass., estimated to cost \$450,000, for which an architect will soon be selected.

J. Purtell, 815 Somerville Avenue, Cambridge, Mass., is inquiring for two turret lathes.

The Wallace Barnes Co., manufacturer of springs, screw machine products, wire, etc., Bristol, Conn., has purchased the plant of the Dunbar Brothers Co., Bristol, also a manufacturer of springs. It is understood the deal involved close to \$750,000. The latter plant will be continued.

The Bigelow Co., manufacturer of stacks, tanks, etc., New Haven, Conn., will increase its capital stock from \$300,000 to \$1,000,000, a portion of the proceeds to be used for expansion.

Philadelphia

PHILADELPHIA, March 19.

JAMES PETERS & SON, 1934 North Front Street, Philadelphia, manufacturers of bolts, hinges and other hardware products, have awarded contract to the William Steele & Sons Co., 219 North Broad Street, for a new building to cost about \$17,000.

The Edward Wilkie Motors Co., 917 North Broad Street, Philadelphia, local representative for the Buick automobile, has leased the four-story building, 38 x 160 ft., to be erected by J. C. Kahn, Morris Building, at 1415 North Broad Street, at a cost of \$120,000, for which contract has just been let to the Nelson Pedley Construction Co., 1615 Spruce Street. It will be equipped as a parts, service and machine repair works.

Power, conveying and other equipment will be installed in the nine-story factory to be erected by Stephen F. Whitman & Son, Inc., 415 Race Street, Philadelphia, manufacturer of confectionery, estimated to cost \$500,000 with machinery, for which a general contract has just been awarded to the William Steele & Sons Co., 219 North Broad Street.

The Hinkle Foundry Co., Paul and Van Dyke Streets, Philadelphia, recently incorporated with a capital of \$25,000, has filed plans for a one-story foundry. C. H. Anthony, 6300 North Eleventh Street, is treasurer.

The Steward & Romaine Mfg. Co., Philadelphia, has been formed under State laws with a capital of \$75,000 to take over and extend the plant and business of the company of the same name, with factory at 124 North Sixth Street, specializing in the manufacture of expansion bolts. N. Harper Steward is treasurer.

The Foreign Trade Bureau, Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Monterey, Mex., desiring to get in touch with American manufacturers of iron, tin and zinc enameled numbered plates; also, from a concern at Havana, Cuba, in the market for twisted, round and square steel bars.

The J. H. Bradley Mfg. Co., 705 North Twelfth Street, Philadelphia, manufacturer of metal hospital furniture, etc., has leased property at Broad and McFerran Streets, totaling 3000 sq. ft., for extensions.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, plans the installation of additional pumping machinery at its water plant at the Enola, Pa., repair shops, in connection with a new reservoir to triple the present capacity, estimated to cost \$100,000.

The Standard Crown Co., Lippincott and Mascher Streets, Philadelphia, manufacturer of metal bottle seals, etc., has leased a factory at Hart Lane and Emerald Street, approximating 12,000 sq. ft., for a new plant.

A manual training department will be installed in the proposed two-story and basement senior and junior high school, 60 x 280 ft., to be erected at Norristown, Pa., estimated to cost \$250,000, for which plans will soon be drawn.

The project referred to last week as that of the Atlas Portland Cement Co., covering the installation of power equipment at the cement mills at Martin's Creek, Pa., and an appropriation of \$1,000,000 for extensions and improvements to other mills, should properly be the Alpha Portland Cement Co., with headquarters at Easton, Pa. The Atlas company does not operate a mill at the location noted.

An ice and cold storage plant will be installed in the proposed five-story and basement warehouse to be erected at Sixteenth Street and Summer Avenue, Allentown, Pa., by John L. Lordan, Allentown, and associates. It is estimated to cost \$400,000. A company is being organized with Mr. Lordan as president.

Fire, March 14, destroyed a portion of the plant of the American Road Machinery Co., Kennett Square, Pa., with loss estimated at \$250,000, including buildings, equipment and stock. S. J. Phillips is president. It is planned to rebuild immediately.

The Chapman Slate Co., Bethlehem, Pa., is considering plans for the complete electrification of its plant at Chapman Quarries and will install motors, controllers and other equipment.

The Metropolitan Edison Co., Reading, Pa., is completing negotiations for the purchase of the Hanover Power Co., Hanover, Pa., and its subsidiary companies. Extensions and improvements will be made to the power plant and system, including the installation of additional equipment. A fund of \$1,000,000 is being arranged to carry out the expansion.

The Harrisburg Gas Co., Harrisburg, Pa., is considering the installation of additional equipment at its pressure plant, to include a 200-hp. boiler, air compressor with capacity of 125,000 cu. ft. per hr., and auxiliary machinery.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, will build a new car dumper at Port

Richmond, with electric power house and auxiliary buildings, estimated to cost \$1,500,000. An electro-pneumatic interlocking and signal plant for service at Philadelphia, Harrisburg and vicinity, will be installed at a cost of about \$250,000, with equipment.

Work will commence at once on a new power plant at the works of the Binney & Smith Co., Easton, Pa., manufacturer of lamp black, etc., in connection with other additions to cost in excess of \$150,000, with machinery.

The Reading Ice & Cold Storage Co., Reading, Pa., has plans for an addition to its ice-manufacturing and storage plant. It will be electrified in all departments and the expansion is estimated to cost \$90,000, with equipment.

To meet the demand for electric power and lighting service in the territory of the Pennsylvania Edison Co., the New Jersey Power & Light Co., the Metropolitan Edison Co., and the New Jersey Power Corporation, whose stock is owned by the General Gas & Electric Corporation, will start at once the erection of a new steam power plant on the Delaware River at Holland, about eight miles south of Easton, Pa. The property acquired comprises about 60 acres advantageously located along the river, and the Belvedere division of the Pennsylvania Railroad passes through the property. This new plant will be connected to the Metropolitan Edison Co. by steel tower transmission lines which are already being constructed and which will be continued to Easton. It will also be connected with the territory of the New Jersey Power & Light Co. by transmission lines which will be completed within the next few months. Plans for the new plant have been completed for some time, contracts for machinery awarded, and work is under way on the premises. A plant, the duplicate of the above, will be started at once on the Susquehanna River, where property has been acquired near Middletown.

Motors, conveyors and other power and mechanical equipment will be installed in the five-story and basement printing plant, 180 x 400 ft., to be erected at Broad and Callowhill Streets, Philadelphia, by the *Philadelphia Inquirer*, 1109 Market Street, estimated to cost \$500,000 with machinery. H. E. Blackman is secretary. Rankin, Kellogg & Crane, 1012 Locust Street, are architects.

The Doran Engineering & Supply Co., 503 North Tenth Street, Philadelphia, manufacturer of mechanical equipment, has leased a factory at 921-23 Hancock Street, for a new plant.

Baltimore

BALTIMORE, March 19.

THE Pennsylvania Railroad Co., Philadelphia, will commence the erection of a new engine house with repair department, 120 x 120 ft., at Hagerstown, Md. Three other shop buildings will also be erected, including a concrete coal-ing plant, 40 x 40 ft.

The West Penn Power Co., West Penn Building, Pittsburgh, is perfecting plans for extensions and improvements in the plants and system of the Edison Electric Illuminating Co., and the Cumberland Valley Railway Co., Cumberland, Md., including the installation of additional machinery.

A manual training department will be installed in the proposed two-story and basement high school to be erected at Havre de Grace, Md., estimated to cost \$90,000. Hamme & Witman, City Bank Building, York, Pa., are architects.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until April 10 for 26,000 sq. ft. of wire cloth for the Mare Island Navy Yard, schedule 609; also for 2000 gage glasses, schedule 626; until April 3, for 7500 lb. of mixed nuts for Eastern and Western yards, schedule 616; and for 6000 fuse covers for Iona Island, N. Y., schedule 624.

The Wilson-Hock Co., City Point, Va., machinery dealer, is making inquiries for an engine lathe, with 16-in. swing and 12-ft. bed; also for an electric alternator, 200 kva., three-phase, 60-cycle, and one 400-hp. Corliss engine to operate at 125 r.p.m., with 140 lb. steam pressure.

H. L. Lawton, Lena, S. C., is in the market for an industrial locomotive of Lima-Shay type.

The F. P. Burton Lumber Co., Charleston, S. C., has tentative plans for rebuilding its mill and power house, destroyed by fire March 7 with loss estimated at \$400,000, including machinery.

W. H. Clark, Stuart, Va., has inquiries out for an electric-generator set, about 80 kw.

The Southern Spindle & Flyer Co., 805 West First Street, Charlotte, N. C., manufacturer of textile machine equipment, will commence the erection of a new one-story machine shop.

The Linde Air Products Co., 30 East Forty-second Street, New York, is planning the erection of a new plant at Savannah, Ga., estimated to cost \$125,000.

The Board of Public Works, Norfolk, Va., will take bids until April 2 for watertube boilers, about 225 hp. capacity. Dabney H. Maury, 1445 Monadnock Block, Chicago, is consulting engineer. Walter H. Taylor, 3d, is director of the board.

The American Iron Works, Kernersville, N. C., P. O. Box 138, recently incorporated with a capital of \$75,000, is in the market for equipment for the manufacture of furnaces, etc., including a 2-ton cupola, foundry apparatus, sheet-metal working equipment, etc. Allen C. Smith is general manager.

The Georgia Railway & Power Co., Atlanta, Ga., is arranging a fund of \$18,000,000 for new power plant construction, extensions and improvements during the next 36 months. The work will include the erection of four new hydroelectric power plants, of which two will be commenced during the summer. Additions will be made, also, to the Butler and Davis Street steam-operated plants at Atlanta, while new substations will be built at La Fayette, Marietta, Summerville and other points. New steel tower transmission lines will be built. H. M. Atkinson is chairman of the board, and P. S. Arkwright, president.

The Atlantic Supply Co., 421 Water Street, Norfolk, Va., marine equipment, is planning to rebuild the portion of its works recently destroyed by fire with loss of about \$60,000. The Empire Machinery & Supply Co., occupying adjoining property, will also rebuild the section of its works destroyed by the same fire, with loss approximating \$12,000.

A manual training department will be installed in the new high school to be erected at Louisburg, N. C., estimated to cost \$90,000, for which bids are being asked on a general contract until March 26. Frank B. Simpson, Raleigh, N. C., is architect.

The Moultrie Plow & Foundry Co., Moultrie, Ga., recently organized, has arranged for the operation of a local plant to manufacture plows and parts, iron castings for farm machinery, etc.

A machine shop will be installed in the printing plant to be erected by the *Baltimore News* and the *Baltimore American*, Baltimore, two stories and basement, 100 x 200 ft., estimated to cost \$200,000. Motors, power equipment, conveying and other machinery will be installed.

The Hackley-Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, is in the market for a double-friction drum hoisting engine, 7 x 10 in., without boiler.

A manual training department will be installed in the new high school to be erected at Franklinton, N. C., estimated to cost \$165,000. The Board of Education is in charge.

The Industrial Power Equipment Co., 10 East Fayette Street, Baltimore, is making inquiries for a 40-in., 220-volt lifting magnet, Cutler-Hammer type preferred.

The Little-Dewey Veneer Co., North Emporia, Va., recently organized with a capital of \$100,000, has plans for the erection of a new plant, including power house. Inquiries are being made for engine, boiler, transmission equipment and machinery. R. W. Little is secretary and treasurer.

Pittsburgh

PITTSBURGH, March 19.

WHILE there has been no appreciable let-down in the inquiries for machine tools in this district, business placed has been on a somewhat smaller scale. There is no good reason for the contraction in purchases other than the natural reaction after a brisk period of sales over the first two months of the year. A fair number of cranes has been placed the past week, but these inquiries are also more numerous than sales. There is a lively market in power equipment.

Announcements have been made of advances of from 5 to 15 per cent in sheet metal-working machinery, and higher prices for other equipment are probable before long. Producers of steel castings have notified customers of an impending increase, effective April 1, of 20 per cent over current quotations.

Extensions at the plant of Duquesne Light Co., Colfax, Pa., call for the installation of two 40,000-hp. steam turbine generating units with auxiliary equipment. Dwight B. Robinson & Co., Inc., New York, is the engineer.

The Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, is actively engaged in plant improvements at Ford City, Pa., and at its chemical works, Zanesville, Ohio, and recently placed the steel for a new plant at Creighton, Pa. A shaper and a drill press recently were closed for the new plant, and the company is in the market for a 10-ton, 3-cu.-yd. bucket crane for the Zanesville works.

The Gulf Production Co., a subsidiary of Gulf Refining Co., recently placed orders for condensers, boilers and superheaters for a new plant at Hull, Tex., and is expected to close shortly against three 500-hp. turbines and auxiliary equipment.

Spang, Chalfant & Co., Inc., recently closed for a Sutton-Abramson straightener, and also for three 5-ton two-hook Shaw cranes, with spans of 110 ft., 70 ft., and 60 ft., respectively.

The Union Drawn Steel Co., Beaver Falls, Pa., also bought a Shaw crane recently, 3 tons capacity, with 14 ft. span.

The United Engineering & Foundry Co. has not yet closed for a 3-ton $\frac{3}{4}$ -cu. yd. bucket crane for its Vandergrift, Pa., works.

The Vulcan Mold & Iron Co., Latrobe, Pa., which recently bought a used Shaw crane, has purchased a special 5-ton low-head clearance Shepard crane.

J. N. Chester, engineer, Union Bank Building, Pittsburgh, has issued a pamphlet detailing the equipment which will be required in the new water filtration plant of the city of Wheeling, W. Va. A 10-ton, 39-ft. 8-in. span, 3-motor crane, floor control, is wanted.

Plans are being prepared by the Federal Enameling & Stamping Co., McKees Rocks, Pa., for the immediate rebuilding of the portion of its plant destroyed by fire March 12 with loss estimated at \$200,000 including machinery. C. E. Christman is president.

The Richens Box Co., Jacksonville, Fla., manufacturer of corrugated shipping cases and other paper containers, is contemplating the establishment of a branch plant at Butler, Pa. The company is operating with a capital of \$600,000.

A manual training department will be installed in the new high school to be erected at Derry, Pa., estimated to cost \$150,000. Bartholomew & Smith, Keenan Building, Pittsburgh, are architects.

The United States Auto Parts Co., Pittsburgh, care of Charles P. Hitchens, Citizens' Building, architect, has plans for a new three-story and basement works on Bigelow Boulevard, estimated to cost \$100,000 with equipment.

The Vulcan Oil Refining Co., Kendall Street and Third Avenue, Coraopolis, Pa., is planning for the early rebuilding of the portion of its refinery destroyed by fire March 12 with loss estimated at \$150,000, including equipment. Thomas Allen is general manager.

The Crystal Block Coal & Coke Co., Bramwell, W. Va., is planning for the installation of a new steel tippie. Electric equipment and other machinery will also be installed. J. C. Thomas is president.

The Common Council, Franklin, W. Va., is contemplating the construction of a water power plant on the South Branch of the Potomac River, for municipal electric power service.

The Bessemer & Lake Erie Railroad Co., Union Arcade, Pittsburgh, has plans for extensions and improvements in its locomotive repair shops at Greenville, Pa., including a new tool department to double the present capacity, machine shop addition and turntable, estimated to cost \$100,000, including machinery.

Motors, controllers, conveying machinery and other equipment will be installed in the proposed new printing plant to be constructed by the Erie Lithographing & Printing Co., 10-28 West Fourth Street, Erie, Pa., estimated to cost \$750,000, with machinery.

The Queen City Cutlery Co., Spring and Kerr Streets, Titusville, Pa., is planning for the erection of an addition.

The W. L. Singer Ice Co., McKees Rocks, Pa., is arranging to rebuild its two-story plant, including power house, partially destroyed by fire March 12, with loss estimated at \$75,000 including equipment.

The Bernard Gloekler Co., 1127 Penn Street, Pittsburgh, manufacturer of show cases, refrigerating equipment, etc., is said to be arranging a list of equipment for installation at its new branch plant, 60 x 275 ft., at Erie, Pa., estimated to cost \$60,000.

George W. Riley, Clarksburg, W. Va., is planning to rebuild his automobile top manufacturing plant recently destroyed by fire. An official estimate of loss has not been announced.

The Citizens' Lumber Co., Parkersburg, W. Va., has acquired clay properties heretofore held by the Parkersburg Brick Co., in the Lee's Hill section, and will have plans drawn for new brick manufacturing works with machinery to provide for a capacity of 75,000 brick per day. It is estimated to cost \$100,000, with equipment.

The Titusville Forge Co., Titusville, Pa., will extend operations at its plant to include a department for the production of piston rods; another department will be operated for the manufacture of small turned metal goods.

The Consolidated Power & Light Co., Huntington, W. Va., is arranging a fund of \$7,000,000 for extensions and improvements in its power plants and system during the next 12 to 18 months. Van Horn Ely is president.

Buffalo

BUFFALO, March 19.

RECENT sales of equipment to the drop forge departments of several automobile companies, together with lively inquiries, indicate that there will be considerable addition of equipment in automobile manufacturing plants the first half of the year. One sale announced by the Buffalo Forge Co. is a 13,000-lb. bar cutter to the Willys-Overland Co., Toledo, capacity $3\frac{1}{2}$ in. round bars.

The Buffalo Forge Co. has also sold a 13,000-lb. bar cutter to the Graham Bolt & Nut Co., Pittsburgh; 25,000-lb. cutter to the Warren Tool & Forge Co., Warren, Ohio; double-end punches and shears to the Pittsburgh Railways Co.; 40,000-lb. bar cutter to the Syracuse plant of the Sizer Steel Corporation; one washer punch and one bar cutter to the Chicago, Burlington & Quincy Railroad, Chicago; 30,000-lb. double end punch and shears to the Illinois Central, and a number of smaller orders.

An order has been placed by the American Insulated Wire & Cable Co., Chicago, with the Farrel Foundry & Machine Co., Buffalo, for a one-rod train of copper and brass rolling mills.

Steel towers, capable of withstanding a 90-mile gale, and other equipment will be needed by the Federal Telephone & Telegraph Co., Buffalo, for its new radio broadcasting station to be built on the roof of the Hotel Statler, which is just being completed in this city.

The Fedders Mfg. Co., 57 Tonawanda Street, Buffalo, manufacturer of milk cans and other metal containers, will commence the erection of a two-story addition, 35 x 165 ft., to cost \$35,000. Carl Schmitt & Sons, 1338 Prudential Building, are architects.

The Phelps Boat Co., Chaumont, N. Y., has inquiries out for an electric portable drill and portable forge.

The National Paper Products Co., Carthage, N. Y., is negotiating for a lease of the mill of the International Paper Co., at Glen Park, N. Y. It is planned to install additional machinery for the production of tissue paper.

The American Brake Shoe & Foundry Co., 1673 Bailey Avenue, Buffalo, is considering tentative plans for an addition; improvements will be made also, in the existing works. A power plant is under consideration.

A manual training department will be installed in the proposed new high school at Dolgeville, N. Y., now being considered by the Board of Education, estimated to cost \$225,000.

The Board of Trustees, Lyndonville, N. Y., will receive bids until April 6 for pumping machinery, water tower, valves and valve boxes, etc., for a municipal waterworks. Hopkins & Field, 349 Cutler Building, Rochester, N. Y., are engineers. Richard N. Parsons is president of the board.

Waterman & O'Brien, Broadway, Watertown, N. Y., operating a metal-working shop, will install a 16-in. engine lathe, machinists' bench vise, tools, etc. R. L. Waterman is head.

A manual training department will be installed in the new two-story high school to be erected at Celoron, N. Y., estimated to cost \$90,000. Johnson & Ford, Fenton Building, Jamestown, N. Y., are architects.

The Larrabee-Deyo Motor Truck Corporation, 23 Washington Street, Binghamton, N. Y., has acquired a site at Main and Emma Streets and plans the erection of new works, to cost close to \$200,000 with machinery. Frank T. Macey is vice-president.

The Algonquin Paper Co., Ogdensburg, N. Y., will remodel and extend its plant, installing additional paper-making machinery and equipment for mechanical pulp production. A fund of \$600,000 has been arranged for the work. George M. McKee is president.

The South Rutland Dairy Products Association, South Rutland, N. Y., has inquiries out for two triple-block chain hoists, 1 and $1\frac{1}{2}$ -tons capacity, respectively.

The Yates Electric Light & Power Co., Penn Yan, N. Y., is contemplating the construction of a new power plant in the Cascade Mill section, estimated to cost \$400,000 with machinery.

The American Mfg. Concern, Falconer, N. Y., manufacturer of mechanical and other toys, novelties, etc., is con-

sidering plans for a three-story addition, 60 x 105 ft., estimated to cost \$50,000.

The Gauthier Co., Gouverneur, N. Y., operating a machine shop, plans the installation of a lathe, drill press, bench tools and other equipment.

A manual training department will be installed in the new high school to be erected at Lakewood, N. Y., estimated to cost \$130,000, for which bids on general contract will be asked early in April. Johnson & Ford, Fenton Building, Jamestown, N. Y., are architects.

Construction of a \$1,000,000 plant for the extraction of gas and various chemicals from coal is planned by the Hendoh Chemical Co., Buffalo, as soon as approval is given by the Public Service Commission of a 50-year contract between this company and the Republic Light, Heat & Power Co. whereby gas would be furnished for distribution throughout western New York. A site will be sought in North Buffalo.

The Electro Metals Radiator Corporation, Iroquois Building, Buffalo, F. Abbott, head, has plans for the establishment of a factory at Lockport, N. Y., to manufacture special process radiators.

A manual training department will be installed in the two-story and basement high school to be erected at Gardenville, N. Y., estimated to cost \$125,000, for which bids on a general contract will be called at once. George A. Setter, 67 Burch Street, Buffalo, is architect.

Detroit

DETROIT, March 19.

THE Watts Laundry Machine Co., St. Joseph, Mich., is planning the erection of a one-story addition, 60 x 80 ft., estimated to cost \$50,000 with machinery. T. J. Watts is head.

The United States Radiator Co., 127 Campbell Street, Detroit, has awarded contract to the Austin Co. for the erection of a one and two-story foundry addition, to cost approximately \$100,000, with equipment.

The Paige-Detroit Motor Car Co., Fort and McKinstry Streets, Detroit, has plans under way for an addition to its plant on West Warren Avenue, estimated to cost \$1,000,000 with machinery. It is expected to commence work late in July.

Officials of the Michigan Stove Co., 3310 East Jefferson Street, Detroit, have organized the Art Stove Co. under State laws, with capital of \$100,000, to succeed to the plant and business of the company of the same name at 6531 Russell Street. It will be operated as an affiliated works. Extensions and improvements in the Russell Street plant are under consideration. William T. Barbour is head of both organizations.

A manual training department will be installed in the three-story and basement junior high school to be erected at Pontiac, Mich., estimated to cost about \$450,000, for which an architect will soon be selected to prepare plans.

The Wilt Machine Co., 314 Bagley Avenue, Detroit, is inquiring for a small punch press.

The Ford Motor Co., Highland Park, Mich., will commence the construction of a four-story generator plant at its local works, to cost \$50,000 exclusive of equipment.

The United Steel & Wire Co., Battle Creek, Mich., has preliminary plans for rebuilding the portion of its plant destroyed by fire March 9, with loss estimated at \$225,000, including buildings, machinery and stock.

A manual training department will be installed in the three-story and basement high school, 133 x 136 ft., to be erected at Ann Arbor, Mich., estimated to cost \$300,000, for which bids will soon be called on a general contract. Childs & Smith, 64 East Van Buren Street, Chicago, are architects.

The Clayton & Lambert Mfg. Co., 10,629 Knodell Avenue, Detroit, manufacturer of blow torches, metal stampings, etc., has awarded contract to the Wisconsin Bridge & Iron Co., Penobscot Building, for a new one-story machine shop to cost \$35,000.

The Commonwealth Power Corporation, Bay City, Mich., has adopted a constructive program to include the erection of a new 30,000-hp. steam-operated generating plant on the Saginaw River; the construction of a steam-operated electric plant on the Illinois River, near Peoria, Ill., with capacity of 53,000 hp.; completion of the new hydroelectric generating plant on the Ausable River, Alcona, Mich.; additions in substations, steel tower transmission lines and other miscellaneous work, estimated to cost more than \$10,000,000.

The Michigan Seating Co., Jackson, Mich., manufacturer of car seats, has plans nearing completion for an additional story to its main factory. A new building, 88 x 132 ft., will also be erected, and a power house, 75 x 132 ft.

The Piston Ring Co., Muskegon, Mich., announces the immediate erection of a one-story addition, 120 x 222 ft., to cost about \$200,000.

The Aubin Terminals Corporation, Detroit, will erect a warehouse and freight terminal on the Detroit River near the West Grand Boulevard. Plans have been drawn for an eight-story building, 195 x 389 ft. Officers of the company are W. A. Aubin, president; William H. McCloud, vice-president; David C. King, treasurer; E. J. Goodbold, secretary, and Thomas Lowery, superintendent.

Chicago

CHICAGO, March 19.

THE volume of current business is somewhat below the average of recent weeks, although demand is still of healthy proportions. Orders are coming from a wide variety of miscellaneous shops, and cover practically all types of machines. Punch presses have been particularly active. A manufacturer of metal furniture in this district purchased eight No. 5½ Niagara presses, as well as an abrasive surface grinding machine. Among other companies which have placed orders for a few machines are the American Spiral Pipe Works and the Hurley Machine Co., Chicago, and the Sinclair Refining Co. The latter closed for a 4-ft. radial drill. The American Steel Foundries has placed an order for a 2500-lb. steam hammer for its Hammond, Ind., plant.

There has been no further railroad buying, although new inquiries have made their appearance. The Union Pacific has made the following additions to its pending list: One 44-in. boring mill, two double-end heavy duty axle lathes, one 90-in. driving wheel lathe, one 30-in. engine lathe, and one 4-in. pipe machine. All of these tools are to be motor-driven. The Rock Island is inquiring for a 2-in. double-head bolt cutter, an 84-in. guide bar grinding machine, a 36-in. drill press, a portable milling machine and a combination boring and mortising machine. This equipment, with the exception of the guide bar grinder, which will be motor-driven, is to have belt drive. The Santa Fe has put out inquiries for a 14-in. plain head turret lathe and a 20-in. drill press. The trade still looks forward to the early appearance of an extensive list from the Illinois Central, as well as inquiries for a considerable number of tools from the Rock Island.

Price tendencies continue upward. A milling machine company has raised its line about 10 per cent, and similar advances have been made by the National Automatic Tool Co. on its multiple spindle drills, and by the Ferracute Machine Co. on punch presses. Gardner disk grinding machines have gone up about 10 per cent, while the Abrasive Grinder Co. has advanced abrasive surface grinders 12½ per cent. The Canedy-Otto Co. has raised 20-in. upright drilling machines 10 per cent, while the Silver Mfg. Co. has marked up some sizes of upright drills 5 per cent.

A. Finkl & Sons Co., manufacturer of iron and steel forgings, 1326 Cortland Street, Chicago, is having plans prepared for a one-story foundry to cost \$250,000.

C. Nielsen, 709 Fulton Street, Chicago, has let contract for a one-story factory, 75 x 93 ft., for the manufacture of passenger and freight elevators, at 2706-10 West Lake Street, to cost \$25,000.

The Pullman Co., Chicago, has let contract for a one-story car shop at Cottage Grove Avenue and 103rd Street, to cost \$40,000.

The Raymond Brothers' Impact Pulverizer Co., 1327-35 North Branch Street, Chicago, has let contract for a one-story machine shop to cost \$60,000.

Contracts for the extension of the Orton-Steinbrenner Co. plant at Huntington, Ind., are expected to be placed soon. The company, which manufactures locomotive cranes and buckets, will add road machinery to its line of products.

The Consumers' Power Co., Bay City, Mich., will soon start the construction of a power plant at Milwaukee, Mich., intended especially to supply the demands of Bay City, Saginaw and Flint, which will ultimately cost upward of \$7,000,000. The plant will be an auxiliary to the company's hydro-electric power system on the Au Sable River, and will

be tied up with its State-wide electric system. The first unit, which will be completed late this year, will be of 20,000 kw. capacity, or one-fifth of the ultimate size.

H. Sundstrom, 8028 South Chicago Avenue, Chicago, has let contract for a one-story machine shop, 45 x 61 ft., to cost \$10,000.

The Richardson Ballbearing Skate Co., manufacturers of roller skates, 1809 Belmont Avenue, Chicago, has purchased a factory on West Ravenswood Park, 72 ft., south of Otto Street, and will move from its present location to the new quarters.

The Alberene Stone Co., manufacturer of laundry tubs, 214 North Clinton Street, Chicago, has purchased the plant of the U. S. Industrial Alcohol Co., at the northwest corner of Elston and Wabansia Avenues, 100 x 150 ft., and improved with a one and two-story building.

The Kokomo Steel & Wire Co., Kokomo, Ind., is building an addition to its galvanizing department, 90 x 340 ft. The concrete foundation was put in some time ago, and construction work on the superstructure started Jan 15. The building is expected to be completed within five or six weeks.

The Frantz Mfg. Co., Sterling, Ill., manufacturer of hinges, door latches and other hardware specialties, has awarded contract to Albert H. Reed, 1103 Sixth Avenue, for a one-story addition, 60 x 175 ft., to cost about \$35,000. It will be equipped as an assembling department.

The Ford Motor Co., Detroit, has awarded contract to Stone & Webster, Inc., Boston, for its new automobile plant at High Dam on the Mississippi River, between St. Paul and Minneapolis, Minn., estimated to cost \$10,000,000. The project will include a parts manufacturing and assembling works, with hydroelectric generating station.

The Eagle Iron Works, Inc., Court and Southeast Third Streets, Des Moines, Iowa, has plans for a new two-story and basement factory, 80 x 280 ft., estimated to cost \$100,000 with machinery. W. B. Holtzman, Jr., 406 Flynn Building, is architect.

A vocational department will be installed in the new two-story junior high school to be erected on Fremont Avenue, near Twenty-sixth Street, Minneapolis, Minn., estimated to cost \$500,000, for which foundations will be placed under way at once. F. H. Hafey, 245 Ninth Avenue, is architect.

The Common Council, Willmar, Minn., contemplates the erection of a municipal electric generating plant, estimated to cost \$100,000 with machinery. Cory & Lecoco, Aberdeen, S. D., are engineers.

The Delta Star Electric Co., 2433 Fulton Street, Chicago, has been making inquiries for a four-spindle drill press, Barnes type.

A manual training department will be installed in the new two-story senior high school to be erected at Oelwein, Iowa, estimated to cost \$200,000, for which bids will soon be called on a general contract. William Gordon, Hubbell Building, is architect.

A manual training department will be installed in the new high school to be erected at Edwardsville, Ill., estimated to cost \$300,000. K. Kane, Bohn Building, is architect.

The Ferry Screen Co., 1323 Nicholas Street, Omaha, Neb., is planning to rebuild the portion of its wire screen plant destroyed by fire March 10, with loss estimated at \$25,000, including equipment.

The Illinois Central Railroad Co. is preparing plans for an addition to its Burnside shops, Chicago. The present capacity will be doubled, and the completed shops will be the largest for railroad repairs, it is said, in the country. It is planned to complete the work within a year.

The Heggie Simplex Boiler Co., 1708 Collins Street, Joliet, Ill., recently incorporated with \$150,000 capital stock, combines the management of James G. Heggie & Sons, Inc., of Joliet, fabricator of steel products with that of Simplex Boilers, manufacturer of portable steel heating boilers. The Simplex boiler is a combination of a fire box and return tubular types, with fire box the full length of the boiler. The company will also manufacture garbage burners. Officers are James G. Heggie, president; John F. Heggie, vice-president and general manager; and C. A. Russell, secretary and treasurer.

A manual training department will be installed in the three-story junior high school, 450x450 ft., to be erected at Hamline, St. Paul, Minn., estimated to cost \$500,000. F. X. Tewes, City Hall, is architect.

The Cerro Gordo Brick & Gravel Co., Mason City, Iowa, is contemplating the erection of a new one-story plant for the manufacture of brick, tile, etc., estimated to cost \$45,000 with machinery. A power house will be built. C. I. Snyder is secretary.

Cleveland

CLEVELAND, March 19.

THE Stearns Co., Cleveland, is buying equipment for its new unit for manufacturing medium priced automobiles, and its requirements are placed at 75 to 100 machines. The company placed an order during the week for 12 milling machines with a Cincinnati manufacturer. Generally, the market continues fairly active, but orders for the most part are for small lots of single machines. A fair volume of business continues to come from Detroit automobile manufacturers. Some dealers report an improved demand for high grade used machinery, which they attribute to advancing prices for new tools. Deliveries on some lines are becoming a little slow, particularly on large swing lathes, on which manufacturers are not promising shipments within 30 to 60 days. Fair prices were received for the equipment of the B. & W. Tool & Die Co., which was offered at auction last week, the most important item, a No. 2 Brown & Sharpe milling machine, bringing \$1050.

Prices continue to advance. During the week a line of grinding machines was advanced 8 to 15 per cent and a milling machine company advanced prices 10 to 20 per cent.

The Ideal Electric & Mfg. Co., Cleveland, has placed an order for a 100-in. boring mill.

The American Steel & Wire Co., Cleveland, is inquiring for a 18-in. x 8-ft. lathe.

The Pittsburgh Plate Glass Co. will erect a large plant at East Fultonham, near Zanesville, Ohio.

The Tad Buckle Co., New Britain, Conn., has purchased the plant formerly occupied by the H. B. Young Motor Truck Co., Geneva, Ohio.

The C. & G. Cooper Co., Mount Vernon, Ohio, will erect three buildings at a cost of approximately \$75,000, to include a foundry extension 75 x 100 ft.; a manufacturing building 36 x 130 ft., and a storage building 26 x 120 ft.

The Steigelmeyer Mfg. Co., Seymour, Ind., will shortly begin the erection of a new plant, to include a foundry, forge shop, machine shop and other buildings.

The P. E. Welton Engineering Co., Akron, Ohio, has leased a building on Beech Street for the manufacture of fuel from anthracite screenings and other material.

The Erie Foundry Co., Erie, Pa., will erect a two-story addition, 35 x 70 ft.

The Royal Brass Co., 1430 East Third Street, Cleveland, will build a one-story addition.

The Live Poultry Transit Association, Chicago, is reported to be planning to erect a car repair shop at Kenton, Ohio, at a cost of \$50,000.

The Burch Flow Works, Crestline, Ohio, has purchased the plant of the Crestline Mfg. Co.

Milwaukee

MILWAUKEE, March 19.

DEMAND for machine tools is improving, although the increase in volume continues small. More classes of industries are inquiring for and buying equipment, but the automotive industries and railroads still furnish the bulk of orders. Builders of steam and hydroelectric equipment, ice machines and pumps are becoming more active buyers. Used tools remain an important factor in competition with new tools.

The N. B. Gaston Sons Co., Beloit, Wis., manufacturer of scales and weighing devices, has let contracts for the reconstruction of its plant at 715-721 Second Street, which was badly damaged by fire recently. Considerable new machinery is being purchased. Theodore I. Gaston is secretary and treasurer.

The Racine Pure Milk Co., Racine, Wis., which is enlarging its plant and warehouse and adding a new cold storage building, is inquiring for a 40-ton steam-driven artificial ice producer unit in addition to other equipment. Cahill & Douglas, 217 West Water Street, Milwaukee, are consulting engineers and taking bids.

It is reported that the B. F. Sturtevant Co., Hyde Park, Boston, has concluded the purchase of the works of the Wisconsin Engine Co., Corliss, Wis., and will re-equip the

plant for the production of heating and ventilating machinery. The Wisconsin Engine Co. was adjudicated bankrupt ten years ago, and the works have been variously occupied under lease and lastly used by the Government as a salvage warehouse.

The Seamless Steel Products Co., Milwaukee, expects to start work April 1 on a brick and steel building, 60 x 230 ft., in place of the plant ruined by fire recently. Inquiry is being made for miscellaneous equipment, principally for the production of acetylene gas tanks. E. J. Lansing is president and general manager.

The Western Pump Co., Davenport, Iowa, has acquired the entire business, plant and properties of the Chippewa Pump Co. at Chippewa Falls, Wis., and will continue its operation in the manufacture of deep-well pumping equipment, to supplement its production of shallow well pumps in which the Davenport works are engaged. J. W. Bettendorf, Joseph R. Lane and Ernest E. Bell, principal owners of the Western company, concluded the purchase at Chippewa Falls on March 15.

The Phenix Cheese Co., Plymouth, Wis., which is building a \$100,000 production and warehousing plant, five stories, 65 x 130 ft., is in the market for two 150-hp. boilers, a 300-hp. steam generating unit, and a 30-ton ice producer machine. R. A. Harbach is general manager.

The Board of Education, Juda, Wis., has engaged H. C. Haeuser, 445 Milwaukee Street, Milwaukee, to design a new high school with manual training departments, to cost about \$100,000 complete.

The Trindl Co., Milwaukee, has been incorporated in Wisconsin with a capital stock of \$125,000 to do a general machine shop business, specializing in general automotive repairs and replacements. It takes over the present Milwaukee branch shops of the Trindl Co., Chicago, at 615-621 Wells Street, which will remain under the general management of John C. Trindl. The company is buying additional equipment from time to time to enlarge its capacity.

The Board of Education, Weyauwega, Wis., expects to engage architects at once to design a new high and vocational training school costing about \$125,000 to be erected in place of the building destroyed by fire several weeks ago.

Gill Brothers, Madison, Wis., have acquired a site, 75 x 150 ft., at Webster and Butler Streets and will build a public garage, with machine shop and service floor, at a cost of \$85,000. It will be three stories and basement, and work is to be started about April 15.

The Common Council, Madison, Wis., has approved plans by E. E. Parker, city engineer, for a new sewage disposal plant estimated to cost \$850,000, and authorized a bond issue of \$200,000 for the immediate construction of the first unit, to be ready for operation July 1, 1924. The project calls for considerable pumping machinery, motors, steel and concrete tanks, structural and reinforcing steel, cast iron pipe and other materials.

The Bullard Mfg. Co., Madison, Wis., which was organized a year ago to manufacture piston rings and other automotive specialties, has disposed of its equipment and ceased production. E. J. Bullard is president.

The North Wisconsin Hydro-Electric Power Co., Port Wing, Wis., expects to let contracts April 1 for the construction of a power dam with a head of 42 ft. at Orienta Falls, on the Iron River, and a power house with a capacity of 500 hp. T. N. Okerstrom, Port Wing, is president and general manager.

Hugo A. Kleinstaub, superintendent municipal fire and police alarm telegraph system, and associates, are organizing a company with \$100,000 capital to manufacture a line of automatic, electrically-operated traffic posts and signals, upon which they have been granted letters patent. For the present contracts will be made for castings and other parts and only the final machining and assembling will be done in the plant, which will be opened in leased quarters about April 15.

The Lipman Refrigerator Car & Mfg. Co., Beloit, Wis., has reorganized its personnel following the acquisition of the controlling interest by a group of Rockford, Ill., capital represented by T. E. Swords and D. F. Swords, of Swords Brothers Co.; George O. Forbes and W. A. Forbes, of the Rockford Malleable Iron Co.; F. G. Hoagland, president National Lock Co. Carl E. L. Lipman, president and general manager under the former ownership, retains an interest and becomes vice-president, continuing as chief engineer; T. E. Swords is president, and George O. Forbes, treasurer. J. R. Morash, for 20 years an executive in the General Electric Co., is secretary and becomes general manager. The Lipman company manufactures automatic refrigerating machines and makes installations in railroad refrigerator cars. The main works are in South Beloit and will be enlarged at once, to include a complete machine shop, replacing the present segregated shop on Pleasant Street. The Lipman company is capitalized at \$1,500,000.

The Green Bay Foundry & Machine Works, Green Bay, Wis., states that the contemplated expansion of its plant has been postponed on account of uncertainty of tax legislation in Wisconsin.

The Metal Ware Corporation, Two Rivers, Wis., manufacturing aluminum utensils and other drawn-ware, has increased its capital stock from \$300,000 to \$350,000 to finance extensions of the plant and business. Details are now being worked out. C. F. Kirst is president, and M. J. Gaffney secretary and treasurer.

Indiana

INDIANAPOLIS, March 19.

BIDS on a general contract are being asked until March 27 for a mechanical building for the Board of Education, Indianapolis, for general metal and wood-working, with large repair department. It will be one, two and three stories, 61 x 265 ft., located at Yandes and Sixteenth Streets, and is estimated to cost \$100,000. Donald Graham, 1128 Hume Mansur Building, is architect.

Officials of the McQuay-Norris Co., St. Louis, manufacturer of pistons, piston rings, etc., have organized the McQuay-Norris Bearings Co., under Indiana laws, with capital of \$150,000, to take over the plant and business of the Victor Bearings Co., Indianapolis, recently acquired. The new company plans extensions and improvements. It will be operated as a subsidiary organization. W. K. Norris is president.

The Northern Indiana Power Co., Kokomo, Ind., will issue bonds for \$470,000 and stock in an amount of \$218,000, the entire proceeds to be used for additions and improvements, and the purchase of new machinery. The work will include the installation of additional equipment at the branch power houses at Kirklin and Noblesville.

The Common Council, Laporte, Ind., is planning for the installation of additional pumping machinery at the Kankakee pumping station of the municipal water system. The new unit will cost close to \$25,000, with auxiliary equipment.

The Service Motors, Inc., Wabash, Ind., recently organized under Delaware laws with capital of \$600,000, has taken over the plant of the Service Motor Truck Co., which has been in financial difficulties for a number of months. The new organization will make improvements and plans for immediate operations, specializing in the manufacture of motor trucks and parts, and railroad coaches. Paul Moore, for the past seven years general manager of the former company, is president of the new company; E. L. Mock is secretary and treasurer.

The Common Council, Jasper, Ind., will commence the erection of a new municipal electric light and power plant to cost \$60,000. J. R. Lowe, 111 Third Street, Louisville, is consulting engineer.

Robert Campbell, Indianapolis, will operate a sheet-metal working plant at 1516 Washington Street. A general repair works will be included.

The Davis Motor Car Co., Richmond, Ind., is contemplating doubling production at its automobile plant. George W. Davis is president, and Walter C. Davis, secretary and general manager.

W. A. Shake, Indianapolis, has acquired the East Tenth Street Machine Shop, in which he has heretofore been interested, and will assume active control of the plant. Plans are under consideration for additions and improvements.

Cincinnati

CINCINNATI, March 19.

ORDERS came in slowly the first few days of last week, but toward the latter part buying was resumed and the week ended with an active demand. The largest purchase reported in this market was by the Remy Electric Co., Anderson, Ind., and included 12 special machines, involving an expenditure of approximately \$50,000. The West Virginia Rail Co. also bought two large planers from a local manufacturer. The J. A. Fay & Egan Co. is buying machine tools from time to time for its new plant in the Oakley district. No big inquiries are reported. The Louisville & Nashville Railroad, which purchased a number of miscellaneous machines a week or two ago, is again in the market for tools for its various shops. Inquiries outstanding for single machines are very large and with a definite trend toward higher prices it is expected that many will be closed shortly. Some manufacturers report orders on

hand sufficient to insure present operation through April.

Price advances during the week include a prominent line of milling machines, from 5 to 15 per cent, and a line of abrasive grinders 10 per cent. A number of lathe manufacturers are preparing to issue new lists which will show substantial advances.

The machine tool equipment of the plant of the J. A. Fay & Egan Co., Second and Front Streets, Cincinnati, will be disposed of at auction April 18, the Effron Co. having charge of the sale. The company recently purchased a new plant in the Oakley district and will equip it with new machinery.

The Springfield Cinder Block Co., Springfield, Ohio, has been incorporated with a capitalization of \$20,000 to manufacture building blocks. It has leased part of the plant of the Indianapolis Frog & Switch Co. John L. Bushnell is president.

The Indiana General Service Co., Marion, Ind., will expend approximately \$350,000 in the erection of a coal storage plant and for equipment for its electric lighting plant in Marion.

The Kentucky Refractories Co., Chinnville, Ky., has been organized and contemplates the expenditure of \$750,000 for plant and equipment. Clyde K. Turley, Ironton, Ohio, is president of the company.

The Gulf States

BIRMINGHAM, March 19.

PLANS are being arranged for a one-story foundry addition at the plant of the Birmingham Machine & Foundry Co., Birmingham, Ala., to cost approximately \$25,000, including equipment.

The Missouri Pacific Railroad Co. and the Texas & Pacific Railroad Co., both with offices at St. Louis, are perfecting plans for the joint construction of new locomotive and car repair shops at Alexandria, La., to include new engine houses, machine shops, power house and auxiliary buildings, estimated to cost \$1,000,000, with machinery; a new freight terminal is also included in this fund.

G. R. Mueller, Brown-Marx Building, Birmingham, machinery dealer, is in the market for an 8-wheel locomotive crane, 15 to 20 tons capacity, with 40 to 50-ft. boom.

The Trinity & Brazos Valley Railroad Co., Fort Worth, Tex., has plans for the electrification of its line from Hillsboro to Cleburne, Tex., to include the installation of a power house and electric substation, and electric line apparatus. The project is estimated to cost \$100,000.

The Griswold Oil Co., Electra, Tex., has arranged an appropriation of about \$500,000 for its proposed refinery, and will commence work at an early date. A site has been purchased near the Colorado-to-Gulf highway. The plant will have an initial capacity of 2500 bbl. per day, and will be supplemented with a gasoline refinery to cost approximately \$100,000, with machinery.

R. E. Boggs, 1315 Jefferson County Bank Building, Birmingham, machinery dealer, is inquiring for two locomotive cranes, 20 and 25-ton capacity, respectively, without buckets; also, for a steam shovel, Marion model 300, preferred.

A manual training department will be installed in the new high school to be erected at Aberdeen, Miss., for which bonds for \$125,000 have just been approved. An architect will soon be selected.

L. B. Vanderslice, 523 Orange Street, Lakeland, Fla., is in the market for stove parts and is interested in companies manufacturing castings of this character.

The Reo Motor Car Co., Lansing, Mich., has leased a three-story building at 2113-17 Main Street, Dallas, Tex., for a factory branch. A parts, service and general machine department will be installed.

The new oil refinery to be constructed by the Pure Oil Co., Columbus, Ohio, at Smith's Bluff, Tex., will be a joint project of the Humphreys-Pure Oil Co., same address, and will involve an investment of \$2,000,000. A tract of 750 acres has been purchased and in addition to the main refinery, a power house, machine shop and other buildings will be erected. Ten 55,000-bbl. steel tanks will be installed. William P. Gage is vice-president in charge.

The Townsend Sash, Door & Lumber Co., Lake Wales, Fla., is planning for an addition to its mill and will install considerable new equipment, including planer, molder, chain mortiser, ripping and jointing machine, motors and transmission apparatus. J. F. Townsend is president.

The Belton Ice & Refrigerating Co., Belton, Tex., is contemplating the erection of a new ice-manufacturing and re-

frigerating plant to cost \$70,000 with machinery. It will replace a structure recently destroyed by fire.

The Texas Iron Works Co., Houston, Tex., is arranging for the early operation of its new plant, now in course of completion, and will use the property as a central works for the manufacture of oil-well machinery and supplies. A large portion of the plant will be given over to forgings and all work of this character, heretofore carried out at other plants, will be handled here. The branch works at Blue Ridge and Pierce Junction, Tex., will be continued.

The Arab Gasoline Co., Eastland, Tex., is planning for the erection of a new gasoline refinery, estimated to cost \$150,000 with machinery.

The City Commission, Ennis, Tex., has approved plans for a municipal electric power plant to cost \$50,000, and will soon call for bids for equipment.

The Osceola Cypress Co., Osceola, Fla., is making inquiries for a 35 to 40-ton industrial locomotive, standard gage, rod-type.

The Dallas Refining Co., Dallas, Tex., recently organized with a capital of \$175,000, has acquired 12 acres on the West Dallas Pike, as a site for a new refinery. It will cost about \$150,000, with machinery. O. F. Kullenberg is one of the heads of the company.

The Chamber of Commerce, Byers, Tex., has tentative plans for the establishment of a municipal electric light and ice-manufacturing plant, estimated to cost \$85,000. R. L. Ligon is head of the committee in charge.

The Central South

ST. LOUIS, March 19.

THE St. Louis & San Francisco Railroad Co., St. Louis, will soon take bids for the erection of a new car and locomotive repair plant on Fyler Avenue, to include machine shop, power house and other buildings, estimated to cost \$500,000, with machinery.

The Jarecki Mfg. Co., West First Street, Tulsa, Okla., manufacturer of iron and brass goods, has plans for a two-story addition.

A power house will be constructed by the Ismert & Hincke Milling Co., Tenth and Washington Streets, Topeka, Kan., in connection with additions to its plant.

The Commissioner of Indian Affairs, 310 Elm Street, St. Louis, will take bids until April 30 for mechanical equipment, including pipe cutters, pipe wrenches, mechanical belting, carriage and machine bolts, punches, galvanized wire cloth, etc., all as set forth in proposal known as Class 17.

The Laclede Gas Light Co., Eleventh and Olive Streets, St. Louis, has completed plans for a one and two-story machine shop, with automobile service and repair departments for company cars, 100 x 175 ft., estimated to cost \$60,000.

A manual training department will be installed in the proposed new high school to be constructed at Bowling Green, Mo., estimated to cost \$90,000, for which an architect will soon be selected to prepare plans.

Hydraulic and electric machinery, presses, conveyors and other equipment will be installed in the new plant of the International Paper Stock Co., St. Louis, estimated to cost \$55,000.

The Mississippi River Commission, Custom House, Memphis, Tenn., will receive bids until March 26 for 870,000 lb. of galvanized wire, wire strand and staples and 24,000 wire rope clips, as per specifications on file.

Officials of the Business Men's Club, Walton, Ky., are perfecting plans for the establishment of a local ice-manufacturing and refrigerating plant. J. L. Reeves, president, is making inquiries regarding machinery.

W. P. Wright, Appleton City, Mo., has plans for a new one-story and basement ice manufacturing plant at Beloit, Kan., estimated to cost \$40,000. Frank Slack, Beloit, is architect.

The Common Council, Kirksville, Mo., has called a meeting April 17 to vote bonds for \$260,000 for extensions in the waterworks plant and system, including the installation of electrically operated pumping machinery and other equipment. Black & Veatch, Kansas City, Mo., are engineers.

The Chesapeake & Ohio Railroad Co., Richmond, Va., has tentative plans for the construction of additions to its locomotive repair shops at Russell, Ky., to double the present capacity. A new engine house, machine shop, boiler shop and other structures will be erected. F. I. Cabell is chief engineer.

Bolger & Medley, Owensboro, Ky., are contemplating the erection of a new plant to manufacture brick and tile products, to include machine shop and power house, estimated to cost \$60,000.

The Knox Porcelain Co., Knoxville, Tenn., recently organized with a capital of \$370,000, has acquired about five acres and will soon commence the erection of the first unit of its proposed plant to manufacture electrical porcelain products. It will include a power house, machine shop and other buildings, estimated to cost \$75,000. Later two additional units will be built. J. N. House is president.

The Louisville Gas & Electric Co., Louisville, will make extensions and improvements in its hydroelectric power plant at Ohio Falls, including the installation of additional machinery.

A manual training department will be installed in the new two-story junior high school to be erected at Thirty-second Street and Montgomery Avenue, Ashland, Ky., estimated to cost \$110,000, for which bids will be received on a general contract on March 28. Ryson & Foster, Grand Theater Building, are architects.

The Common Council, McKenzie, Tenn., has tentative plans for a municipal ice manufacturing plant, estimated to cost \$40,000.

A manual training department will be installed in the high school to be erected at Laddonia, Mo., estimated to cost \$80,000. Earl Hawkins & Co., 400 McDaniel Building, Springfield, Mo., are architects.

The Tennessee Electric Power Co., Chattanooga, Tenn., is arranging an appropriation of \$1,800,000 for a new hydroelectric power house at Grand Falls, Caney Creek, with capacity of about 20,000 hp. Tentative plans are also in progress for a new steam-operated generating station at Hales Bar, Tenn., with output of 27,000 hp., to cost about \$1,250,000.

The Columbus Mining Co., Hazard, Ky., is planning for extensions and improvements in its plant, including the re-modeling of the tippie at No. 6 mine and installation of new operating machinery; additional electric equipment and the installation of shaker screens, picking tables and other apparatus.

The Kansas Gas & Electric Co., Wichita, Kan., is arranging an appropriation of about \$3,000,000 for its new hydroelectric generating plant on the Neosho River, near Parsons, Kan., including a transmission line to Wichita. L. O. Ripley is vice-president.

A vocational department will be installed in the boys' school to be erected at Oklahoma City, Okla., on East Twenty-third Street, estimated to cost \$90,000. Layton, Smith & Forsyth, 701 Southwestern National Bank Building, are architects.

The Pacific Coast

SAN FRANCISCO, March 14.

THE Pacific Fruit Express Co., Southern Pacific Building, San Francisco, will build an addition, 100 x 175 ft., to its ice-manufacturing and pre-cooling plant at Roseville, Cal., estimated to cost \$150,000. The installation will include two new electric engines of 1500 hp. capacity, ice and refrigerating machinery.

The Oliver Gas Burner & Machine Co., St. Louis, has organized a subsidiary company under the name of the Oliver Dehydrator Co., to establish a plant on the Pacific Coast for the manufacture of dehydrators and mechanical burning equipment. A site is being considered at San Jose, Cal. W. B. Oliver heads the company.

The Orange County Brick & Tile Co., Fullerton, Cal., recently organized, has plans for the construction of works, with daily capacity of 40,000 brick and tile. It is estimated to cost \$50,000, with machinery. A power house will also be erected. F. C. Krause and J. W. Carmichael head the company.

A manual training department will be installed in the new high school to be erected at Chino, Cal., estimated to cost \$90,000. John C. Austin, 1125 Detwiler Building, Los Angeles, is architect.

The Banner Refining Co., Kohl Building, San Francisco, is planning the construction of a new oil refinery at Seattle, Wash., to cost \$180,000 with machinery. It is also considering plans for a similar refinery in southern California or Arizona, to cost a like amount.

The Imperial Ice Co., Venice, Cal., will make enlargements in its plant to increase the capacity from 50 to 102 tons per day. A list of steam and electric machinery to be installed will soon be arranged.

The Union Oil Co., Union Oil Building, Los Angeles, has purchased property at San Diego, Cal., for a new oil storage and distributing plant to cost close to \$100,000, with machinery.

The Compton Mfg. Co., Pixley, Cal., manufacturer of farm and agricultural machinery, is contemplating the erection of a new plant at Fresno, Cal., estimated to cost \$200,000. The present works will be removed to the new

location and considerably extended. The company recently increased its capital to \$300,000. James T. Compton is president and L. C. Clark, treasurer.

The Pacific Fruit & Produce Co., Wenatchee, Wash., is contemplating the construction of a three-story ice and cold storage plant, 100 x 180 ft., at Spokane and Columbia Streets, to cost close to \$85,000, with equipment.

Canada

TORONTO, March 19.

MACHINE tool business continues to show steady improvement. A larger volume of inquiry is featuring the market, with lists calling for a greater variety of equipment. Sales are also on the up-grade and some good orders have been closed during the past 10 days. The Canadian National Railways have just placed orders for equipment amounting to \$500,000 for shops in western Canada, which included some 95 tools and machines, as well as a number of jacks, pneumatic tools, and chain blocks. While Canadian makers received a fair share of this business, the bulk of the orders went to manufacturers in the United States. The demand for equipment from this source since the beginning of the year has been a strong factor in strengthening Canadian activities and it is expected that the railroad will continue to enter the market from time to time for equipment for replacement purposes. Some fairly good sized lists are looked for from the Canadian Pacific Railway.

An active demand for equipment in small units for industrial purposes is also featuring the market. Higher prices are expected on some lines, advances having already gone into effect on lathes, the increase effective from March 1.

William Kennedy & Sons, Ltd., Owen Sound, Ont., have the contract to supply all hydraulic, electric machinery and apparatus for the hydro-electric development project at Megantic, Que.

The London Metal Products Co., London, Ont., manufacturer of electric washing machines, etc., is in the market for metal and wood-working machinery.

The Canadian Pacific Railway Co., Windsor Station, Montreal, is in the market for steel water tanks 60,000 to 100,000 gal. capacity; also a 90-ft. turntable. I. M. R. Fairbairn is chief engineer.

The Electroplax Co., whose plant at Mount Dennis, Ont., was destroyed by fire last fall, has leased the ground floor of the building formerly occupied by the Garlock Machinery Co., Toronto, and will install equipment for the manufacture of electrical supplies, etc.

The Sun Ray Mfg. Co., Guelph, Ont., recently incorporated with a capital stock of \$350,000 to manufacture oil stoves, heaters, etc., will take over the premises vacated by the Moncrief Furnace & Mfg. Co. It expects to employ 40 men in the near future.

The vacuum tube plant owned by the Canadian General Electric Co., Toronto, was totally destroyed by fire March 11 with a loss to building and machinery estimated at \$200,000. J. A. Bremner is assistant general manager.

The plant of the Pocock Mfg. Co., Ottawa and Wallace Streets, Hamilton, Ont., was destroyed by fire March 14 with a loss of \$33,000 to building and equipment. S. J. Pocock, general manager, states that several valuable pieces of machinery which will take months to replace were lost. The company manufactures curtain rods and small metallic fixtures.

Permission has been given for the construction of an elevator at Tarte Pier by the Montreal Harbor Commission. It will have an ultimate capacity of 10,000,000 bu. and will be built in units of 2,500,000 bu. capacity each, the first of which will cost \$2,347,000 and will be started as soon as weather conditions permit. This comprises part of the program of harbor improvements initiated a year ago by the harbor commissioners at a cost of \$50,000,000.

The Ruggles Motor Truck Co., London, Ont., has started work on a 50 x 200 ft. extension to its plant. Additional equipment will be required.

The Asbestos Corporation, Montreal, Que., is having plans prepared for an extension to its plant to have an additional capacity of 1200 tons per shift.

The Preston Wagon & Novelty Co., Preston, Ont., whose plant was destroyed by fire recently, has taken over the building formerly occupied by the Preston Car & Coach Co., and will install equipment.

STEEL AND INDUSTRIAL STOCKS

Alternating Advances and Declines Prevail, but the Week Ends in Firmness

Pauses, advances and declines alternated through a week which seemed to be headed nowhere but, as predicted, the week ended in resuming the bull side. No clearer view can be had of the true market position now than at the first of the week. Net advances and net declines strike close to a balance. After fluctuating with varying general currents of opinion, several stocks, including American Locomotive and Lima Locomotive, reached new highs for their history. Penn Seaboard Steel, one of the low-priced industrials, has taken to firmness on the strength of its recent report. The close was firm. This the bull side calls the end of the reaction, and talks of the renewed advance. But one thing only is certain—the rise is halted. That there is promise in the general prosperity is undeniable; yet this plainly fails to attract. Notwithstanding this, it seems reasonable that while the general market may have reached a definite halt, steel stocks should be good for a rise, whether it be now or two weeks hence.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers...	48 1/2	49 3/4	Lima Loco.	69 1/4	73 1/2
Allis-Chal. pf...	94 1/2	96	Midvale Steel...	30 3/4	32
Am. B. S. & Fdy. 77 1/2	77 1/2	80	Nat.-Acme	14 1/2	15
Am. B.S. & F. pf. 108	108	110	Nat. En. & Stm. 69 1/2	69 1/2	73
Am. Can. 101 1/2	101 1/2	104 1/2	N. Y. Air Brake 36	36	38 1/2
Am. Can pf. 112	112	113 1/2	Otis Steel	12 1/2	13 1/2
Am. Car & Fdy. 182	182	186 1/2	Otis Steel pf.	65 1/2	66 1/2
Am. C. & F. pf. 123 1/2	123 1/2	125	Pitts. Steel pf.	95	97
Am. Loco. 133 1/2	133 1/2	138	Pressed Stl. Car 68 1/2	68 1/2	70
Am. Loco. pf. 118	118	120	Pressed Steel pf. 91 1/2	91 1/2	92 1/2
Am. Radiator ... 84	84	86 1/2	Ry. Steel Spring. 119	119	123
Am. Radiator pf. 122 1/2	122 1/2	123 1/2	Ry. Stl. Spg. pf. 117	117	118
Am. Steel Fries. 38 1/2	38 1/2	39 1/2	Replodge Steel... 27 1/2	27 1/2	28 1/2
Bald. Loco. 139 1/2	139 1/2	142 1/2	Republic	60	61 1/2
Bald. Loco. pf. 114 1/2	114 1/2	115	Republic pf.	95 1/2	96 1/2
Beth. Steel 66 1/2	66 1/2	68 1/2	Sloss	52 1/2	56 1/2
Beth. Steel Cl. B 67 1/2	67 1/2	70 1/2	Sloss pf.	87	90
Beth. Stl. 8% pf. 109 1/2	109 1/2	111 1/2	Steel of Canada. 76 1/2	76 1/2	79 1/2
Br. Em. Steel ... 7 1/2	7 1/2	8	Superior Steel... 33 1/2	33 1/2	34
Br. Em. Stl. 1 pf. 68 1/2	68 1/2	69 1/2	Sup. Stl. 1st pf. 98	98	100
Br. Em. Stl. 2 pf. 23 1/2	23 1/2	25	Transue-Williams 32 1/2	32 1/2	34
Chic. Pneu. Tool 85 1/2	85 1/2	88	Un. Alloy Steel... 35 1/2	35 1/2	37
Colo. Fuel 28 1/2	28 1/2	29 1/2	U. S. Pipe	31 1/2	33 1/2
Crucible Steel... 80 1/2	80 1/2	83 1/2	U. S. Pipe pf.	69 1/2	70 1/2
Crucible Stl. pf. 92 1/2	92 1/2	93 1/2	U. S. Steel	107 1/2	108 1/2
Gen. Electric ... 183 1/2	183 1/2	189	U. S. Steel pf.	119	120
Gt. No. Ore Cert. 33	33	35	Vanadium Steel. 41	42 1/2	44
Gulf States Steel 95	95	99 1/2	Va. I. C. & Coke 63 1/2	64	66
Inland Steel ... 49	49	50	Whouse Air Br. 116 1/2	116 1/2	119 1/2
Int. Har. 92 1/2	92 1/2	93 1/2			

Industrial Finances

The International Steel Tube Co., Cleveland, has been placed in the hands of a receiver following the filing of a voluntary bankruptcy petition. The company places its liabilities at \$172,374, and assets at \$335,300, of which \$310,000 is real estate. The company erected a plant for the manufacture of seamless steel tubing but had not installed the equipment.

The Clement K. Quinn Ore Co., with ore properties on the Mesabi and Cuyuna ranges in Minnesota and on the Marquette range in Michigan, has issued \$1,000,000 in 12-year sinking fund 7 per cent first mortgage gold bonds. The proceeds will be used to retire current indebtedness incurred in development work and to provide funds for stripping two new properties. Present expansion plans will give the company a shipping capacity of 1,000,000 tons a year.

At the annual meeting of the Atlas Forge Co., Detroit, held last week it was announced that the company's business for 1922 was \$500,000 in excess of the previous year. Officers were elected as follows: R. H. Scott, president; J. P. Hopkins, vice-president and general manager; B. L. White, treasurer, and E. W. Goodnow, secretary.

Yale & Towne Mfg. Co. reports net profits for 1922 of \$2,406,664 after depreciation and Federal taxes, or \$6.01 per share on its capital stock, compared with \$1,299,038 in 1921. Profit and loss surplus was \$8,037,148, against \$11,970,955 for last year.

The Hayes Mfg. Co. report covering the last 10 months of 1922 shows a total net loss of \$18,990 was sustained during the first six months of this period. During the last four months net profits of \$60,688 were produced. The bulk of the company's product at the present time is being produced for the following cars: Chevrolet, Maxwell, Overland, Durant, Paige, Jewett and Gray.

The Hupp Motor Car Corporation, Detroit, reports that on Dec. 31, 1922, the company carried forward the largest

surplus in its history, \$8,091,136, a reserve strength that is surprisingly large in proportion to the company's assets and liabilities. Sales during 1922 increased 75 per cent over the biggest previous year.

The Penn Seaboard Steel Corporation and subsidiaries report net operating loss of \$177,199 in 1922. Adding to this interest charges and other fixed expenses, there was a net loss of \$515,447. The general balance sheet shows current assets of \$2,729,164 and current liabilities of \$1,421,384.

In its 1922 report Mack Trucks, Inc., shows net profits of \$3,952,279, after Federal taxes and depreciation, which after preferred dividends was equivalent to \$9.94 per share on the no par common stock. Total sales reached \$31,070,289, compared with \$24,849,258 in 1921.

The New York Air Brake Co. in its report for 1922 shows net profits of \$985,741, after charges and taxes. This compares with net loss in 1921 of \$458,699. Total sales were \$6,711,462, as against \$2,434,744 in the previous year. After allowing dividends on Class A stock, \$4.37 was earned on the common stock.

The Pierce Arrow Motor Car Co. shows manufacturing profits of \$571,991 in its report for 1922, as against a loss in the preceding year of \$1,810,498. Net income after taxes, depreciation and interest, amounted to \$10,809, against a deficit in 1921 of \$8,763,712, of which \$4,197,022 was due to inventory losses.

The Independent Pneumatic Tool Co., Chicago, showed net earnings for the year ended Dec. 31, 1922, of \$644,419, as compared with \$299,675 for 1921. Surplus was increased to \$758,053.

Harbison-Walker Earnings

Harbison-Walker Refractories Co., Pittsburgh, reports earnings for the year ended Dec. 31, 1922, of \$3,037,333 after the deduction of \$901,811 for ordinary repairs and Federal taxes. After depreciation charges aggregating \$557,794 and dividend disbursements amounting to \$1,675,968 there remained a surplus of \$863,571. Total surplus as of Dec. 31, 1922, was \$5,747,029. H. W. Croft, chairman of the board, in his remarks to stockholders said:

"Whereas there were during the year 1921 three reductions in wages amounting in total to 33 1/2 per cent, there was made during the past year one advance of 30 per cent, thereby almost restoring the three reductions of 1921 and again bringing our wage scale within 12 1/2 per cent of the highest peak. The past year's business was somewhat better than was anticipated at the beginning of the year, showing a gradual increase in volume from 40 per cent in January to 75 per cent in December, with an average volume of 60 per cent over the entire year."

National Acme Report

The National Acme Co., Cleveland, during 1922 made a manufacturing profit of \$575,034, as compared with a manufacturing loss of \$91,948 in 1921. It had an operating loss last year of \$170,173, as compared with an operating loss of \$920,087 during the previous year. Its net sales during 1922 were \$5,618,236 and its net loss for the year \$805,010. President A. W. Henn in a letter to the stockholders reviewed conditions during the year and stated that a decided change took place before the close of the year and the steadily increasing volume of business made it possible to keep the greater portion of the plant busy at a fairly satisfactory margin of profit. For the first six weeks of 1923 orders for screw machine products exceeded \$1,000,000 and total orders in all plants for the first two months of this year were in excess of \$2,000,000, or close to the value of all orders for the entire year of 1921. He stated that the turn in the machine tool end of the business also came late in 1922. Orders for screw machines booked in January exceeded the entire number received during 1921.

Highest Mark in Its History

Net sales of the General Motors Corporation for the year ended Dec. 31, 1922, were \$463,706,733, the high mark in its history. After all charges, the surplus available for dividends was \$51,496,136, and after regular dividends on preferred and debenture stocks, requiring \$6,429,228 there remained \$45,066,908, or \$2.19 per share on 20,557,750 shares of no par value common stock outstanding. This shows against a deficit before dividends of \$38,680,770 in the year previous. There was carried to surplus account \$24,889,791, after deducting a common dividend of 50c, against a final deficit in 1921 of \$65,459,057.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price.....	3.34c.
Swedish bars, base price.....	7.50c.
Soft steel bars, base price.....	3.34c.
Hoops, base price	5.19c.
Bands, base price	4.14c.
Beams and channels, angles and tees	
3 in. x ¼ in. and larger, base.....	3.44c.
Channels, angles and tees under 3 in. x ¼ in., base	3.34c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.35c.
(Smooth finish, 1 to 2½ x ¼ in. and larger) ..	3.55c.
Toe-calk, ½ x ¾ in. and larger.....	4.30c.
Cold-rolled strip, soft and quarter hard. .	7.00c. to 8.00c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	4.20c.
Squares, flats and hex.....	4.70c.
Standard tool steel, base price.....	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten.....	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.44c.
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Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R. One Pass. Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 5.55c.	.....
Nos. 22 and 24	4.60c. to 5.60c.	5.35c.
No. 26	4.65c. to 5.65c.	5.40c.
No. 28	4.75c. to 5.75c.	5.50c.
No. 30	5.00c. to 6.00c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.85c.
No. 16	5.00c. to 6.00c.
Nos. 18 and 20	5.15c. to 6.15c.
Nos. 22 and 24	5.30c. to 6.20c.
No. 26	5.45c. to 6.45c.
No. 27	5.60c. to 6.60c.
No. 28	5.75c. to 6.75c.
No. 30	6.25c. to 7.25c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel		Wrought Iron	
Black	Galv.	Black	Galv.
½ in. Butt... —47	—31	½ in. Butt... —4	+19
¾ in. Butt... —52	—39	¾ in. Butt... —11	+9
1-3 in. Butt... —54	—41	1-1½ in. Butt... —14	+6
2½-6 in. Lap. —50	—37	2 in. Lap.... —5	+14
7-8 in. Lap... —47	—20	2½-6 in. Lap. —9	+9
9-12 in. Lap.. —42	—18	7-12 in. Lap.. —3	+16

Steel Wire

	Per Lb.
BASE PRICE* ON NO. 9 GAGE AND COARSER	
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	21¾c. to 22¾c.
High brass wire	21¾c. to 22¾c.
Brass rods	18¾c. to 19¾c.
Brass tube, brazed	28¾c. to 29¾c.
Brass tube, seamless	24¾c. to 25¾c.
Copper tube, seamless	27¾c. to 27¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 24c. to 25c. per lb. base.
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		Prime	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20				
IC. \$11.00	\$9.75	80 lb..	\$6.30	\$6.05	
IX.. 12.25	11.00	90 lb..	6.40	6.15	
IXX.. 13.50	12.25	100 lb..	6.50	6.25	
IXXX.. 14.75	13.50	IC..	6.65	6.40	
IXXXX.. 16.50	14.75	IX..	7.65	7.40	
		IXX..	8.65	8.40	
		IXXX..	9.65	9.40	
		IXXXX..	10.65	10.40	

Terne Plates

	8-lb. coating, 14 x 20
100 lb.	\$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	53c.
Bar	60c. to 65c.

Copper

Lake ingot	19 c.
Electrolytic	18½c.
Casting	18¼c.

Spelter and Sheet Zinc

Western spelter	9c.
Sheet zinc, No. 9 base, casks.....	11c. open 11½c.

Lead and Solder*

American pig lead	9c. to 9¼c.
Bar lead	12c. to 14c.
Solder, ½ and ½ guaranteed	37c.
No. 1 solder	35c.
Refined solder	32c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.....	75c.
Commercial grade, per lb.....	35c.
Grade D, per lb.....	25c.

Antimony

Asiatic	10c. to 11c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....	30c. to 31c.
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Old Metals

Values are higher and the market is firm. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	14.50
Copper, heavy wire	13.75
Copper, light and bottoms	11.75
Brass, heavy	8.25
Brass, light	7.00
Heavy machine composition	11.50
No. 1 yellow brass turnings	8.50
No. 1 red brass or composition turnings.....	10.50
Lead, heavy	7.25
Lead, tea	5.25
Zinc	5.00

